



Pushbuttons

Product Selection Guide

Pushbutton									
Series	ELUM	EP	TP	E020	8020	E010	8060	8500	KM
Switch Type	Mom./Latching	Tiny	Tiny	Snap-acting Mom.	Snap-acting Mom.	Miniature	Alternate Action	Sub-miniature	Sub-miniature
Poles/Throws	SPDT	SPST, SPDT, DPST	SPST, SPDT, DPST	SPDT, DPDT	SPDT, DPDT, 3PDT, 4PDT	SPDT	SPDT, DPDT	SPST	SPST, SPDT
Max. Current	3.5 VA	1 Amp	1 Amp	1 Amp	1 Amp	4 Amps	6 Amps	3 Amps	1 Amp
Process Sealed		•		•		•			
Illuminated	•				•		•	•	
PCB Mount Options									
Thru-hole	•	•	•	•	•	•	•	•	•
Vertical		•	•	•	•	•	•	•	•
Right Angle	•	•	•	•	•	•	•	•	•
Surface Mount	•	•							
Panel Mount			•		•	•	•	•	•
Page No.	A-3	A-9	A-15	A-21	A-29	A-46	A-52	A-62	A-67

Pushbutton							
Series	8600	8700	GP	PN	PHA	F	NE-18
Switch Type	Micro-miniature	Over Travel	Ultra-miniature	Alternate & Mom. Action	Short Stroke	Alternate & Mom. Action	Mains / Power
Poles/Throws	SPST	SPST	SPST, SPDT	SPDT, DPDT, 4PDT	DPDT, 4PDT, 6PDT	DPDT, 4PDT, 6PDT, 8PDT, 10PDT	DPST, DPDT, Varied
Max. Current	500 mA	1 Amp	0A V	200 mA	100 mA	500 mA	6 A
Process Sealed			•				
PCB Mount Options							
Thru-hole	•	•	•	•	•	•	•
Vertical	•	•	•				
Right Angle			•	•	•	•	•
Surface Mount			•				
Panel Mount	•	•				•	•
Page No.	A-71	A-74	A-77	A-81	A-84	A-88	A-98



A
Pushbutton

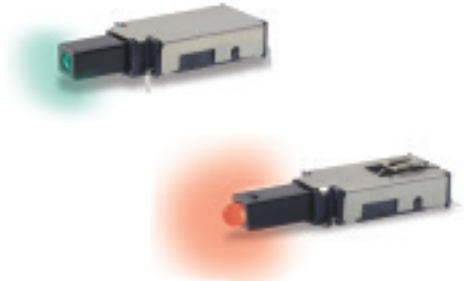
Patent Numbers
6,974,924 B2 US
EP1583118B1 Europe

Features/Benefits

- SPDT (N.O. & N.C.)
- Low height above PCB
- Reliable self-cleaning contact
- Surface-mount or thru-hole PCB
- Standard or custom actuator
- Central LED illumination
- Latching or Momentary
- Long travel. Smooth feel
- RoHS compliant and compatible

Typical Applications

- Telecom network equipment
- Automotive electronics
- Consumer electronics
- Computer, server, modem, data storage
- Professional instrumentation, medical



Materials

FIXED CONTACTS AND TERMINALS: Stainless steel, silver plated with gold flash (STD.)
MOVABLE CONTACTS: Copper alloy, silver plated with gold flash (STD.)
BASE: Glass filled LCP (UL94V-0)
ACTUATOR: Glass filled nylon 4/6 (UL94V-0)
COVER: Stainless steel

Electrical

MAXIMUM POWER: 3.5 VA
MIN./MAX. VOLTAGE: 20 mV – 50 VDC
MIN./MAX. CURRENT: 0.01 mA – 250 mA
DIELECTRIC STRENGTH: ≥ 250 Vrms
CONTACT RESISTANCE: ≤ 50 mΩ
INSULATION RESISTANCE: ≥ 10⁹ Ω
BOUNCE TIME: ≤1 ms
LED SPECIFICATIONS: See page A-5

Mechanical

OPERATING FORCE: 2.5 N at Full Travel
SWITCHING TRAVEL: .067" (1.7 mm)
LATCH TRAVEL: .131" (3.6 mm)
FULL TRAVEL: .200" (5.1 mm)

Operating Environment

OPERATING TEMPERATURE: -40°C TO 80°C.
STORAGE TEMPERATURE: -40°C TO 80°C.
RELATIVE HUMIDITY: 90% R.H. @ 80°C.
OPERATING LIFE: 30,000 Cycles.
VIBRATION: Per EIA 186-E Methods 7 & 8
MECHANICAL SHOCK: Per EIA 186-E Method 12.
OVERLOAD: Withstands 40 N for 1 minute without damage

Process Environment

SOLDERABILITY: According to Mil STD 202F Method 208D or EIA RS-186E Method 9.
LEAD FREE PROCESS COMPATIBLE: 260°C peak, 10 seconds Max. above 250° C.
WASHING PROCESS: No clean process compatible (SMT)
Bottom wash compatible (Thru-hole)
SHEAR TEST (SWITCH/PCB): > 40 N

Packaging

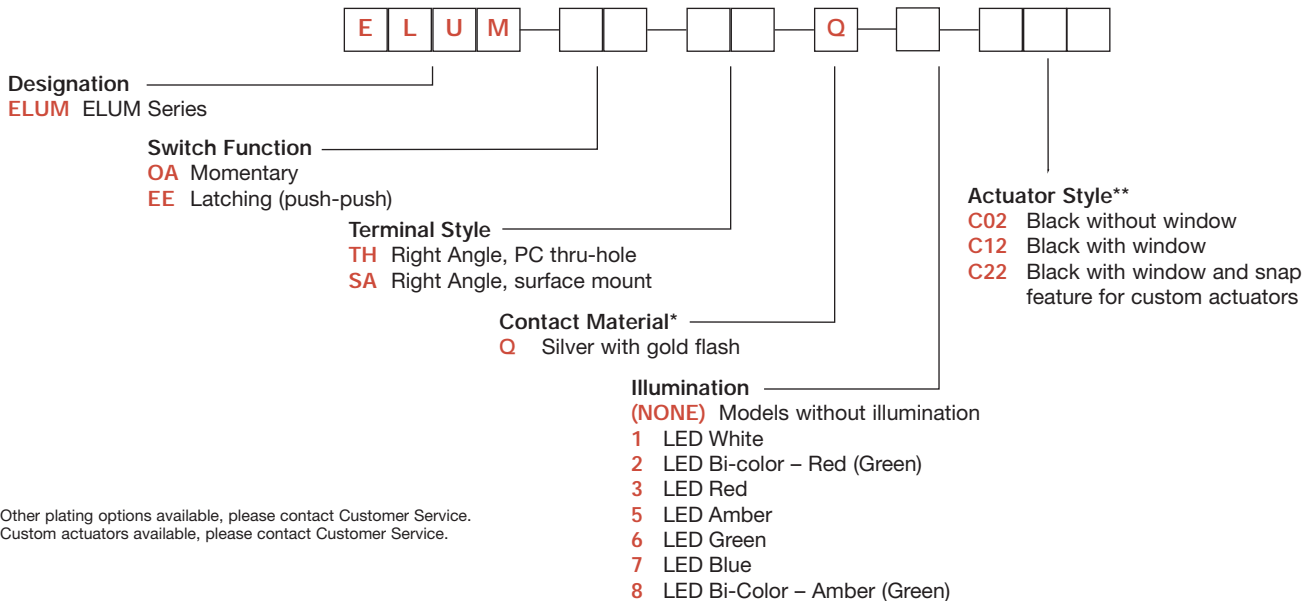
“SA” Terminal Style SMT: Tape and reel per EIA 481-2 (450/reel)
“TH” Terminal Style PC: Tray (60/tray)

NOTE: Any models supplied with Q, contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, please contact Customer Service.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box.



* Other plating options available, please contact Customer Service.
** Custom actuators available, please contact Customer Service.



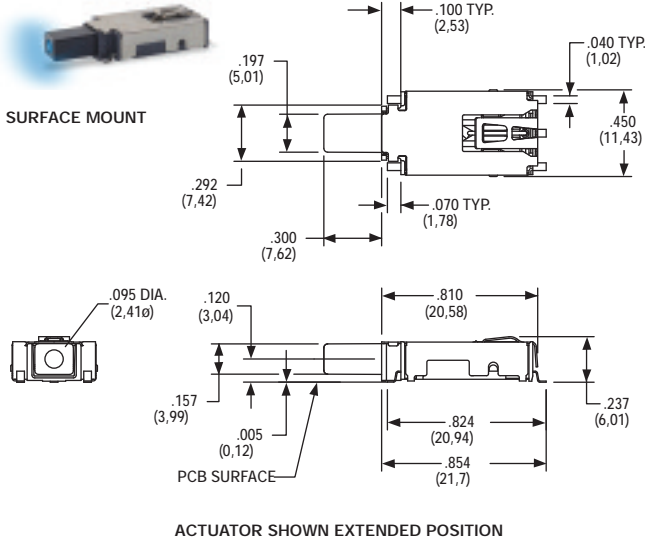


ELUM™ Series Right Angle Illuminated Latching Pushbutton

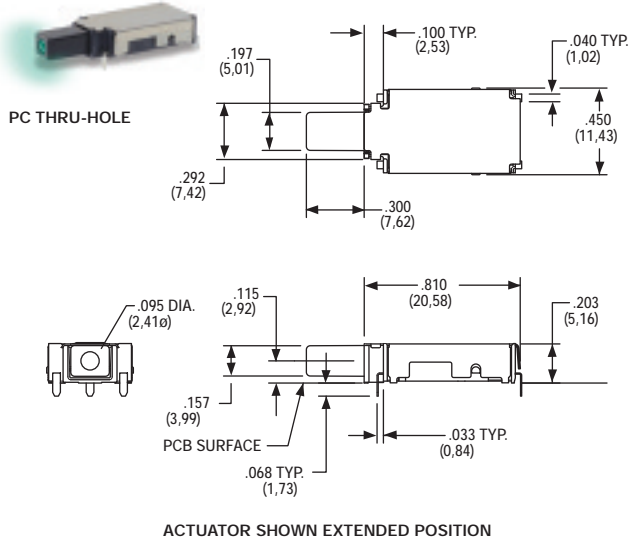
STANDARD OPTIONS

Pushbutton
A

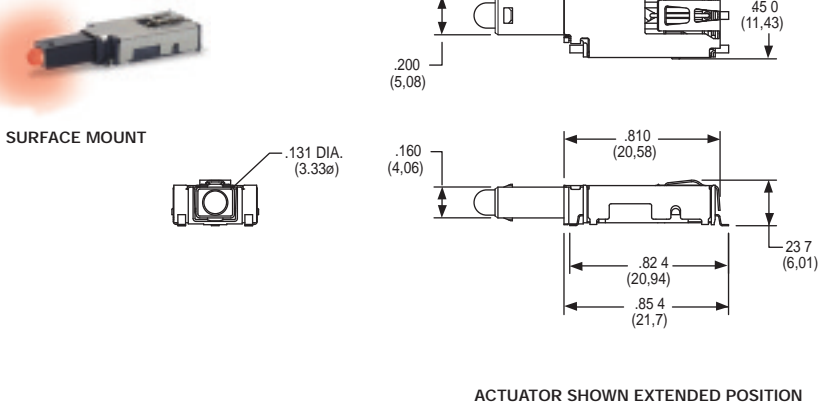
ELUMEESAQ7C12



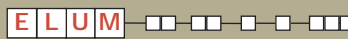
ELUMOATHQ6C12



ELUMEESAQ3C22



DESIGNATION



ELUM ELUM SERIES, Illuminated Latching Pushbutton

SWITCH FUNCTION

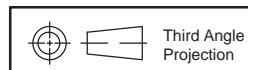
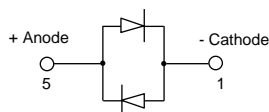


OPTION CODE	NO. OF POLES	POSITION 1	CONNECTED TERMINALS	POSITION 2	CONNECTED TERMINALS	SCHEMATIC
		SWITCH FUNCTION		SWITCH FUNCTION		
OA	SP Momentary	ON	3 - 4	ON (Mom.)	3 - 2	<p>SPDT + Anode - Cathode</p>
EE	SP Latching (Push-Push)	ON	3 - 4	ON	3 - 2	

For SPST N.O. function, only terminals 3 & 2 are used.
For SPST N.C. function, only terminals 3 & 4 are used.
Circuit: Make before break

LED pins 1 & 5 are independent of switch function.

NOTE:
For bi-color LED's the polarity must be reversed to alternate the color



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



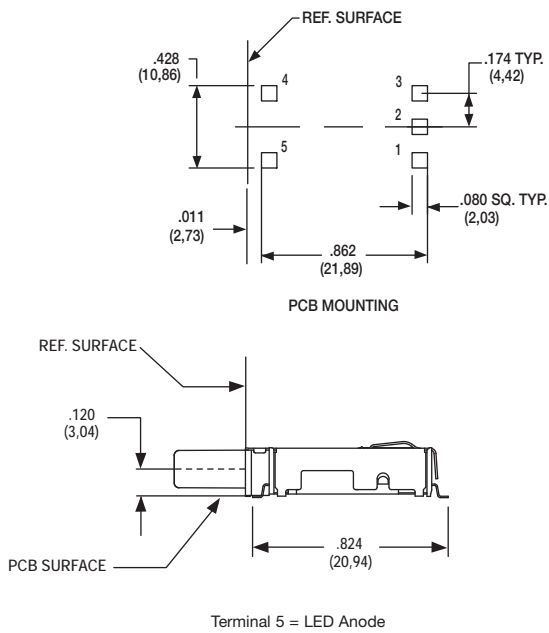
ELUM™ Series Right Angle Illuminated Latching Pushbutton



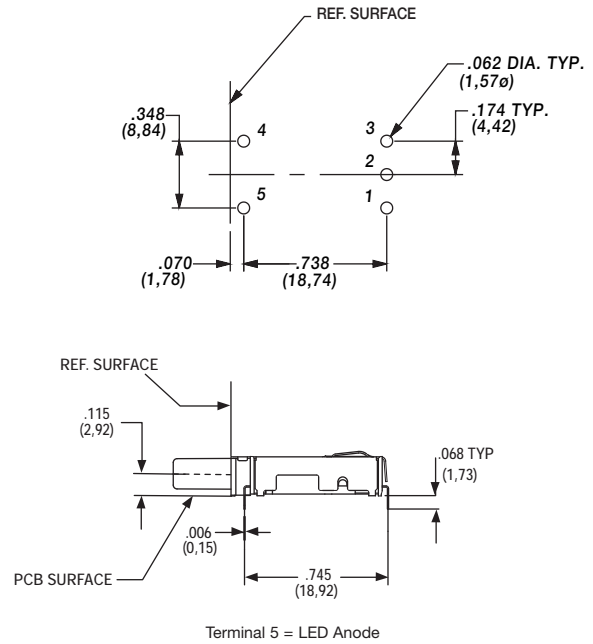
A

Pushbutton

SA RIGHT ANGLE, SURFACE MOUNT



TH RIGHT ANGLE, PC THRU-HOLE



CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS
Q	SILVER WITH GOLD FLASH	SILVER WITH GOLD FLASH	250 mA

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

FIXED CONTACTS AND TERMINALS: Stainless steel, silver plated with gold flash

MOVABLE CONTACTS: Copper alloy, silver plated with gold flash

NOTE: Any models supplied with Q, contact material are RoHS compliant.

ILLUMINATION

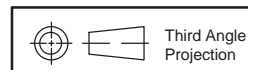
OPTION CODE	ILLUMINATION TYPE	TYPICAL INTENSITY*		PEAK WAVELENGTH	VIEWING ANGLE
		MIN	MAX		
		(mcd)		(nm)	
(NONE)	Model without illumination	N/A		N/A	N/A
1	LED Super White	4,000	5,000	N/A	30°
2	LED Bi-Color – Red (Green)	10	20	635/565	60°
3	LED Red	4	8	700	60°
5	LED Amber	35	50	610	60°
6	LED Green	35	50	565	60°
7	LED Super Blue	800	1,500	470	22°
8	LED Bi-Color – Amber (Green)	10	10	585/565	60°

*LED FORWARD CURRENT: 20 mA

LED FORWARD VOLTAGE: 2.0 V TYP.

LED REVERSE VOLTAGE: 5.0 V MAX

* For information on specific and custom LED, please contact Customer Service.



Third Angle Projection



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



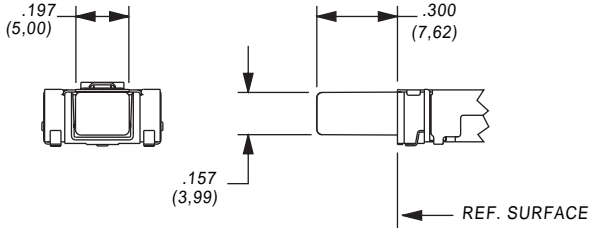
ELUM™ Series Right Angle Illuminated Latching Pushbutton

ACTUATOR STYLE*

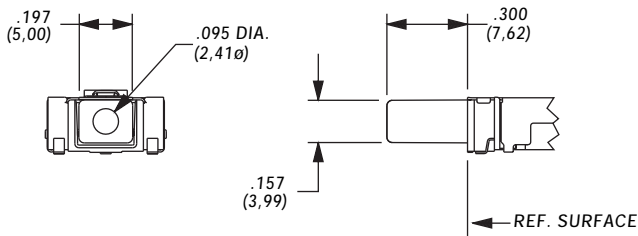


Pushbutton
A

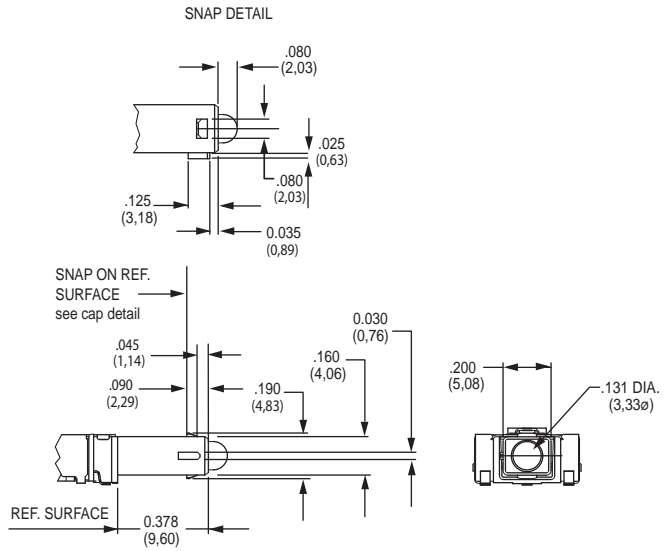
C02 BLACK WITHOUT WINDOW



C12 BLACK WITH WINDOW

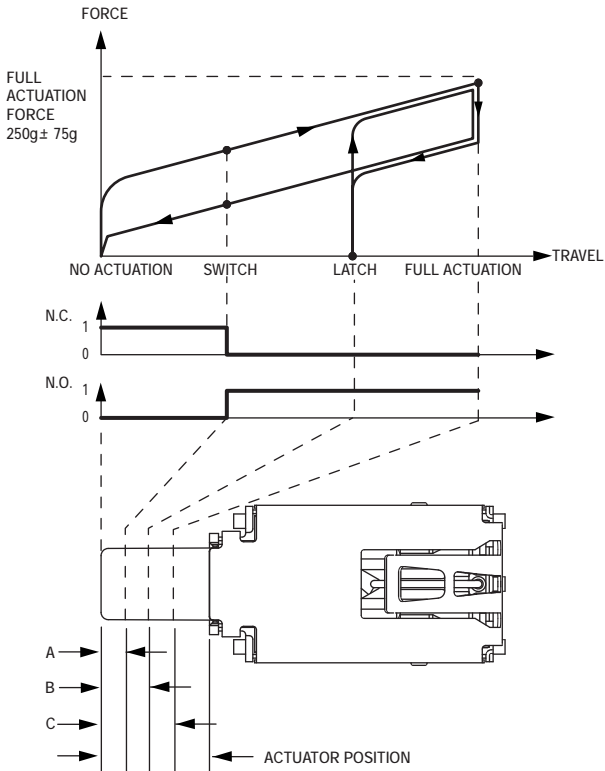


C22 BLACK WITH WINDOW AND SNAP FEATURE TO ACCEPT CUSTOM CAP



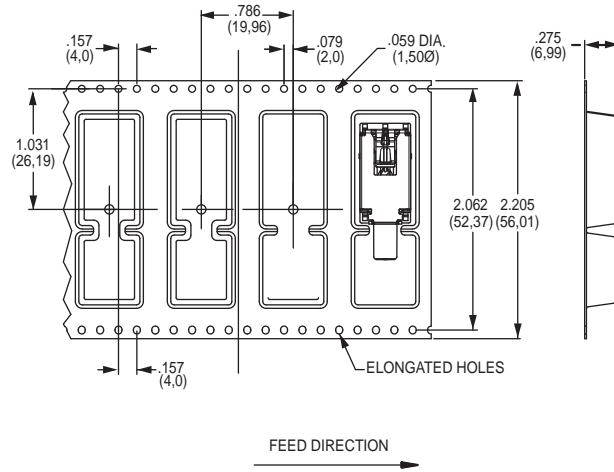
* Custom actuators available, please contact Customer Service.

FORCE TRAVEL DIAGRAM



ACTUATOR POSITION			
A	SWITCH	.067 ± .020	1,7 ± 0.5mm
B	LATCH	.131 ± .020	3,3 ± 0.5mm
C	FULL ACTUATION	.200 ± .020	5,1 ± 0.5mm

TAPE & REEL



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

ELUM™ Series Right Angle Illuminated Latching Pushbutton



A

Pushbutton

Cap



Cap



Cap



PART NO.

957C00000 High temperature black cap with universal standby symbol

956C02000 High temperature black cap with no symbol

Material: 4/6 Nylon SMT compatible

PART NO.

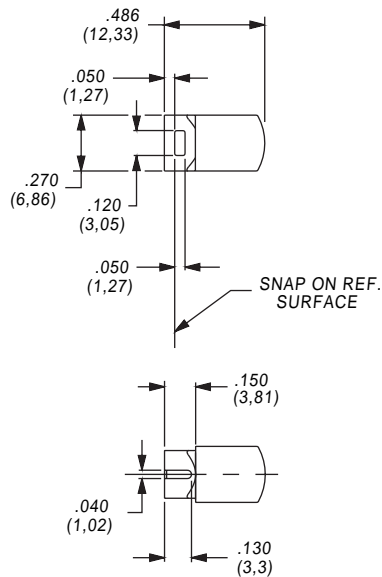
181D01000 Paint and Laser Etched with black paint and universal standby symbol

Material: Clear polycarbonate

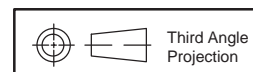
PART NO.

181D00000 Paint and laser etched with white paint underlay and black paint with universal standby symbol.

Material: Clear polycarbonate



NOTE: Caps are for use with the C22 actuator style. Other colors and symbols available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



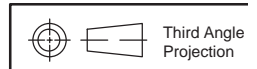
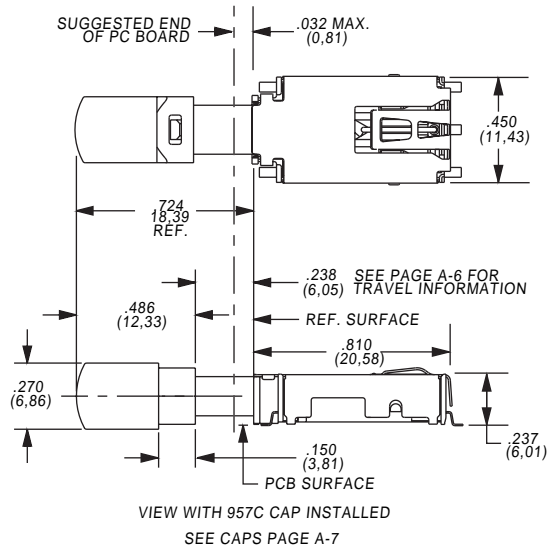


ELUM™ Series Right Angle Illuminated Latching Pushbutton

CAP INSTALLATION

A

Pushbutton



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

EP Series Sealed Tiny Pushbutton Switches



Features/Benefits

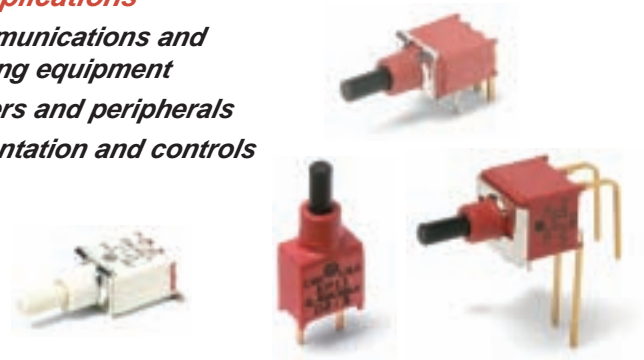
- Sealed against solder & cleaning processes
- Thru-hole and surface mount models
- Snap-fitting actuator accepts standard caps
- Tape & reel packaging available
- RoHS compliant models available



Models Available

Typical Applications

- Telecommunications and networking equipment
- Computers and peripherals
- Instrumentation and controls



Specifications

CONTACT RATING: B contact material: 0.4 VA max. @ 20 V AC or DC max. See page A-13 for additional ratings.

ELECTRICAL LIFE: EP11, EP21 models: 60,000 make-and-break cycles at full load. EP12 models: 30,000 cycles.

CONTACT RESISTANCE: Below 20 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹ Ω min.

DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

DEGREE OF PROTECTION: IP57; Protection against harmful dust deposit, full-scale voltage protection, temporary immersion.

PACKAGING: Surface mount switches standard in anti-static tape and reel packaging per EIA 481-3, see page A-14 for drawings and reel information. Tape and cover strip are conductive for use near statically sensitive components, consult Customer Service Center.

Materials

CASE & BUSHING: High temperature material, glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0) on SMT models; glass filled nylon 6/6 on PC Through Hole models.

PLUNGER: Thermoplastic polyester or glass filled nylon (UL 94V-0), with internal o-ring seal. SA surface mount: High temperature material, glass filled LCP (UL 94V-0).

SWITCH SUPPORT: Brass, matte-tin plated.

CONTACTS & TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. See page A-13 for additional contact materials.

TERMINAL SEAL: Epoxy.

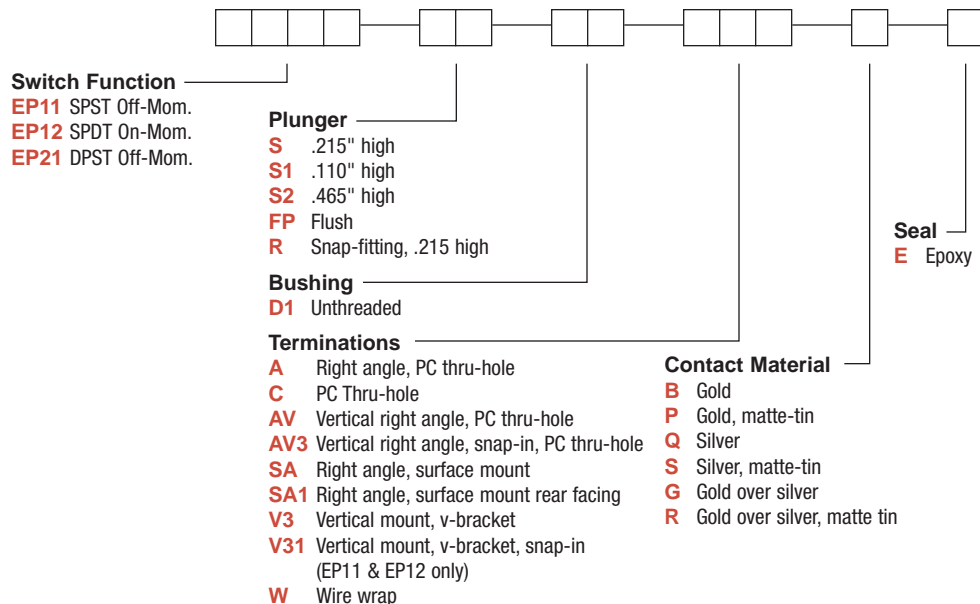
NOTE: Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be taken in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-10 thru A-14. For additional options not shown in catalog, consult Customer Service Center. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



EP Series Sealed Tiny Pushbutton Switches

Pushbutton
A

SWITCH FUNCTION

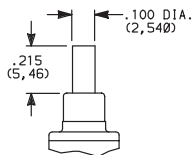
NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	EP11	OFF	MOM.	OPEN	1-3	SPST
	EP12	ON	MOM.	2-1	2-3	SPDT
SPDT <p>Part number shown: EP12SD1CBE</p>						
DP	EP21	OFF	MOM.	OPEN	1-3,4-6	DPST
DPST <p>Part number shown: EP21SD1CBE</p>						

MOM. = Momentary

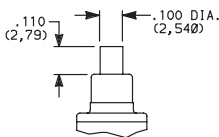
All models with all options when ordered with G, L, M Q, R or S contact material.

PLUNGER

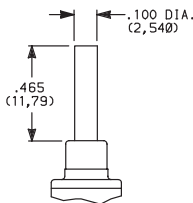
S .215" HIGH



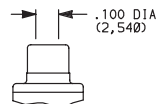
S1 .110" HIGH



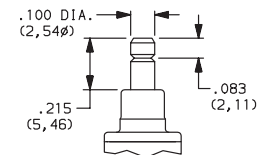
S2 .465" HIGH



FP FLUSH PLUNGER



R SNAP-FITTING



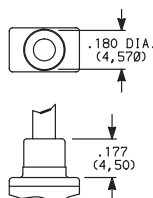
S1 & S2 actuators are not available with EP12 & EP21 models or SA1 termination style.

FP & R actuators are not available with EP21 model or SA1 termination style.

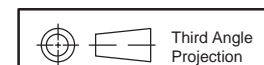
NOTE: Caps available for plunger options, see page A-14.

BUSHING

D1 UNTHREADED



NOTE: Internal actuator o-ring standard.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



EP Series Sealed Tiny Pushbutton Switches



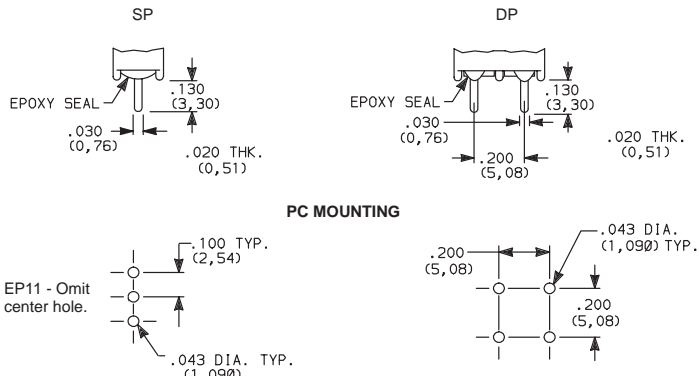
A

Pushbutton

TERMINATIONS

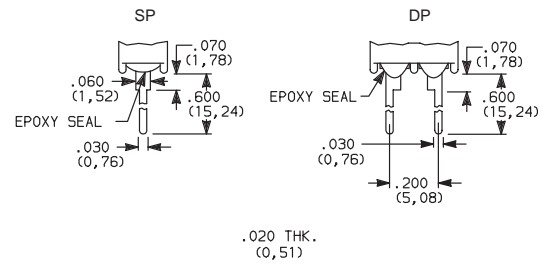


C PC THRU-HOLE



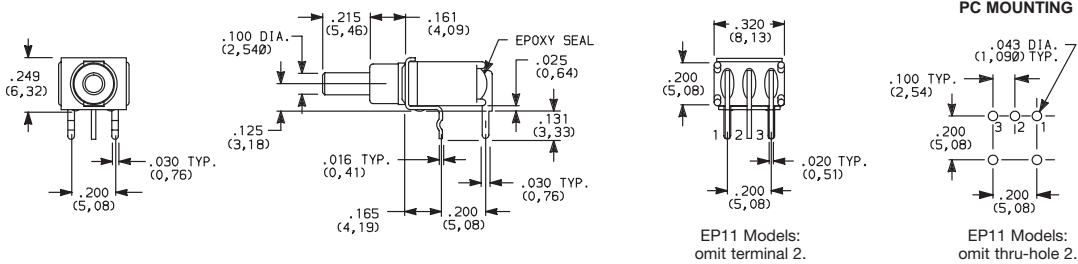
SP and DP

W WIRE WRAP



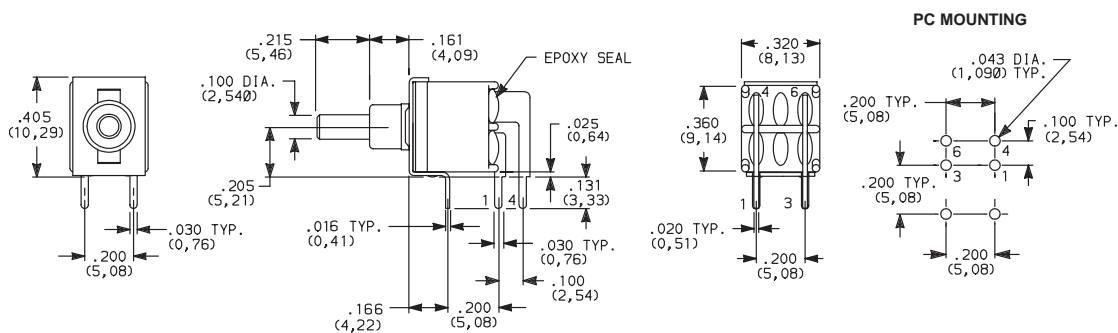
SP and DP

A RIGHT ANGLE, PC THRU-HOLE



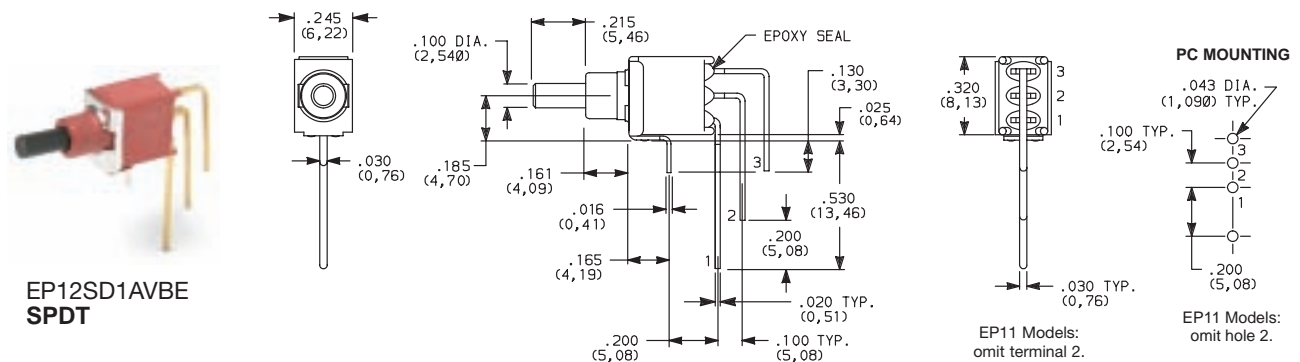
EP12SD1ABE
SPDT

A RIGHT ANGLE, PC THRU-HOLE



EP21SD1ABE
DPST

AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



EP12SD1AVBE
SPDT

NOTE: Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





EP Series Sealed Tiny Pushbutton Switches

TERMINATIONS



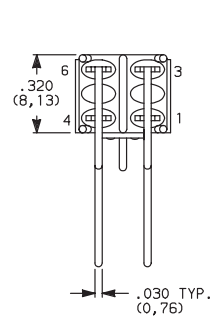
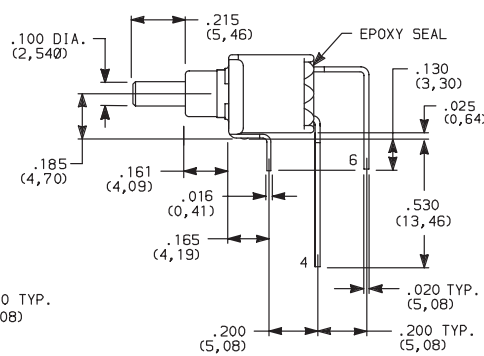
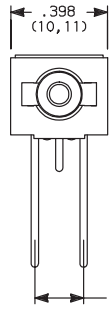
Pushbutton

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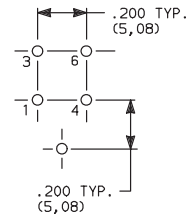
AV VERTICAL RIGHT ANGLE, THRU-HOLE



**EP21SD1AVBE
DPST**



PC MOUNTING

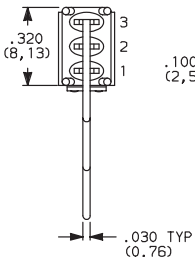
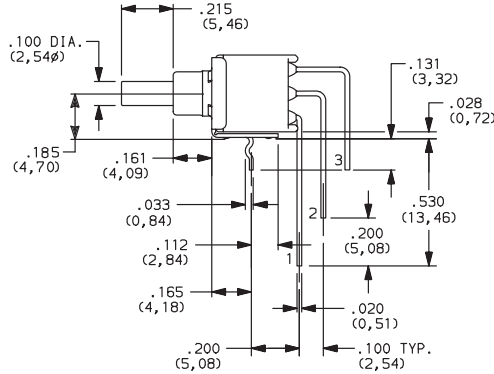
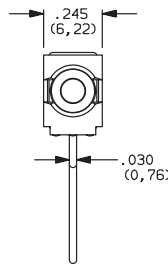


NOTE: Terminal bend radii and lead-in manufacturing option.

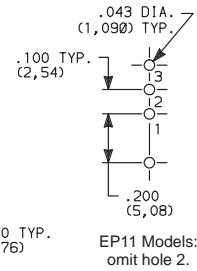
AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



**EP12SD1AV3BE
SPST**



PC MOUNTING

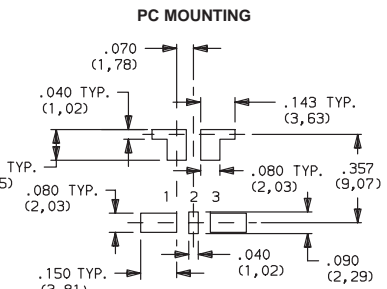
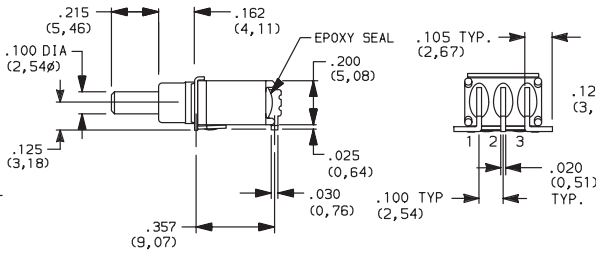
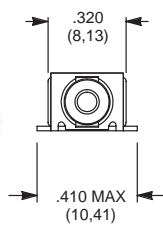


SA RIGHT ANGLE, SURFACE MOUNT

SMT



**EP12SD1SAPE
SPDT**



PC MOUNTING

EP11 Models:
omit pad 2.

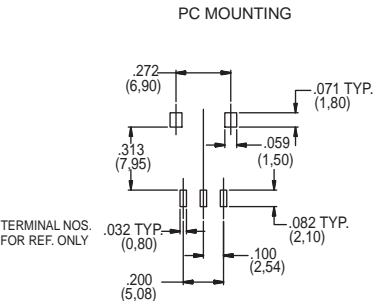
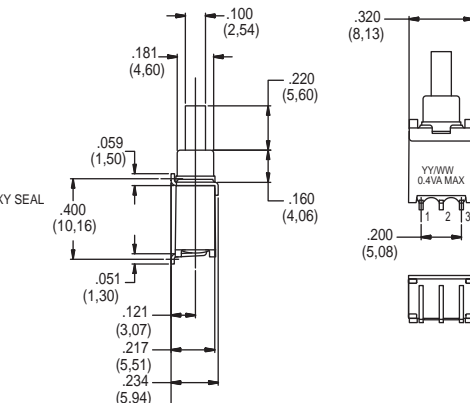
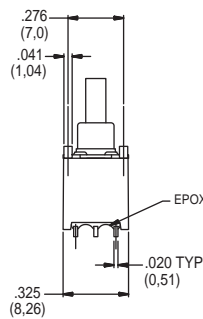
Available with P contact material only.
Not Available on DPST models.

EP11 Models:
omit terminal 2.

SA1 RIGHT ANGLE, SURFACE MOUNT

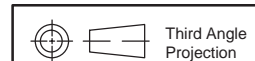


**EP12SD1SA1BE
SPDT**



PC MOUNTING

SA1 is only available with B contact materials option + S plunger.
Not Available on DPST models.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



EP Series Sealed Tiny Pushbutton Switches



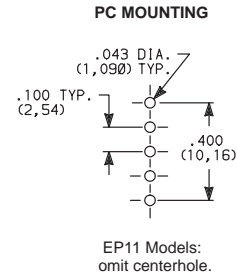
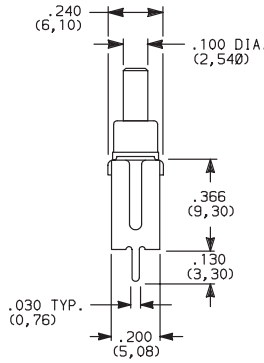
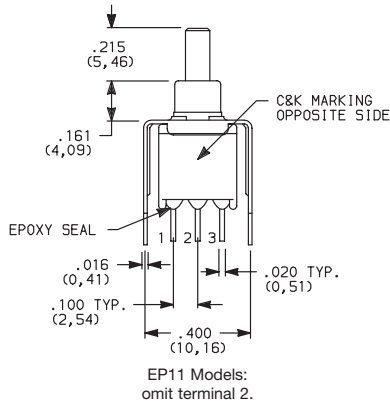
A

Pushbutton

TERMINATIONS

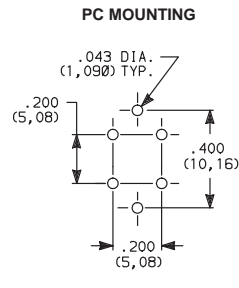
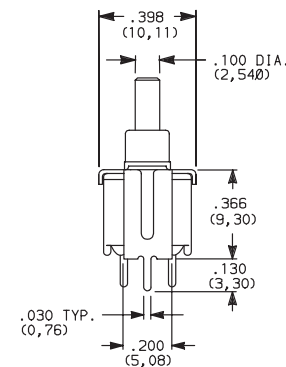
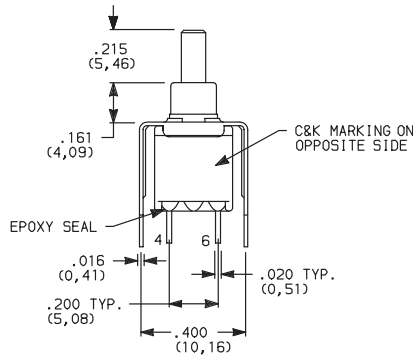
V3 VERTICAL MOUNT, V-BRACKET

V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



EP12SD1V3BE SPDT

V3 VERTICAL MOUNT, V-BRACKET



EP21SD1V3BE DPST

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	1 AMP @ 120 V AC OR 28 V DC.
S		MATTE-TIN ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
R		MATTE-TIN ⁶		

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.

² END CONTACTS: Coin silver, with gold plate over nickel plate.

³ CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

⁴ END CONTACTS: Coin silver, silver plated.

⁵ CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

⁶ TERMINALS: Copper alloy, with matte tin over nickel plate.

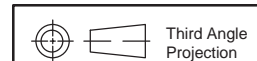
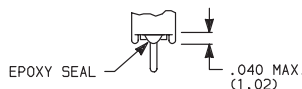
NOTE: Any models supplied with Q, B, P, S, R or G contact material are RoHS compliant.

All models with all options when ordered with G, L, M, S, R or Q contact material.

K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

SEAL

E EPOXY SEAL



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



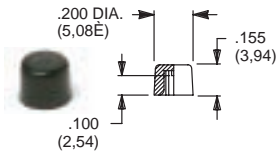


EP Series Sealed Tiny Pushbutton Switches

AVAILABLE HARDWARE

Pushbutton
A

Cap



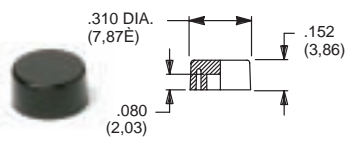
PART NO.

- 508101000** WHITE
- 508102000** BLACK
- 508103000** RED

Material: Nylon
Finish: Gloss

Not for use on S1 plunger

Cap



PART NO.

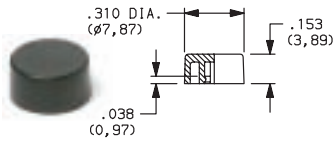
- 465801000** WHITE
- 465802000** BLACK
- 465803000** RED

Material: Nylon
Finish: Gloss

Not for use on S1 plunger

Cap

Compatible with snap-fitting plungers
EP11 & EP12 Models. R option only.



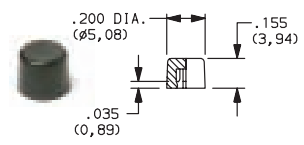
PART NO.

- 585A01000** WHITE
- 585A02000** BLACK
- 585A03000** RED

Material: Nylon
Finish: Gloss

Cap

Compatible with snap-fitting plungers
EP11 & EP12 Models. R option only.



PART NO.

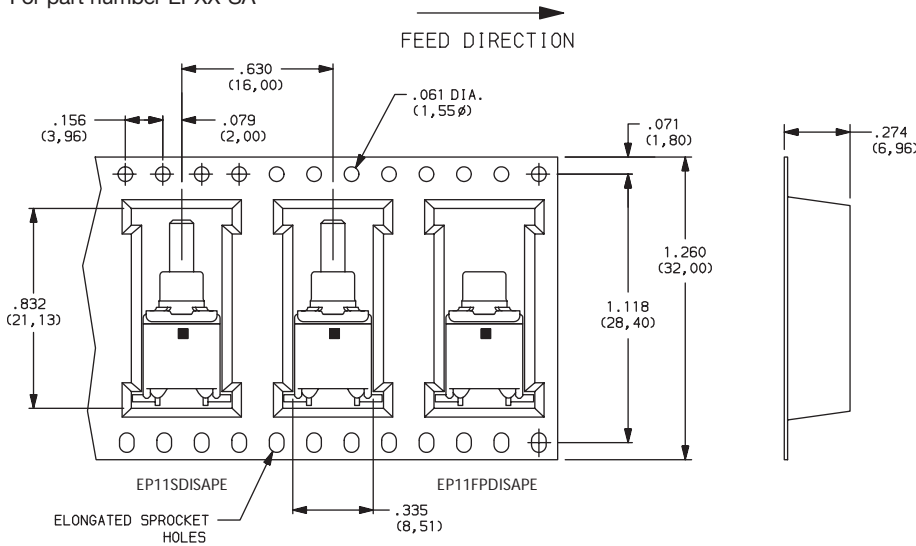
- 785A01000** WHITE
- 785A02000** BLACK
- 785A03000** RED

Material: Nylon
Finish: Gloss

NOTE: Other colors available, consult Customer Service Center.

TAPE & REEL

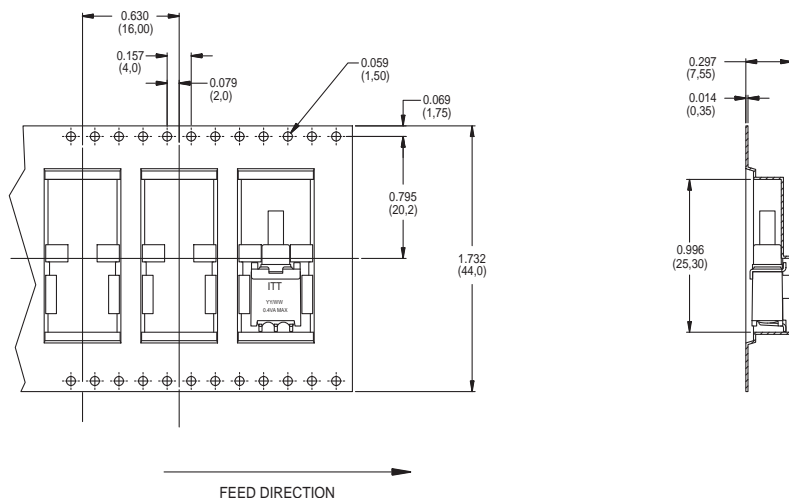
For part number EPXX-SA



REEL INFORMATION

OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.512 (13,0)
QUANTITY PER REEL	600

For part number EPXX-SA1



REEL INFORMATION

OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.795 (20,20)
QUANTITY PER REEL	500



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



TP Series Tiny Pushbutton Switches



A

Pushbutton

Features/Benefits

- **Subminiature size—capable of switching 1 AMP**
- **Vertical & right angle terminations**
- **PC & panel mount models**
- **Snap-in front panel mounting available**
- **Epoxy terminal seal-compatible with bottom wash cleaning**
- **RoHS compliant models available**



Models Available

Typical Applications

- **Telecommunications and networking equipment**
- **Computers and peripherals**
- **Instrumentation and controls**



Specifications

CONTACT RATING: B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material: 1 AMP @ 120 V AC or 28 V DC. See page A-19 for additional ratings.

ELECTRICAL LIFE: TP11, TP21 MODELS: 60,000 make-and-break cycles at full load. TP12 MODELS: 30,000 cycles.

CONTACT RESISTANCE: Below 20 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹Ω min.

DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

NOTE: Any models supplied with Q, B, P, R or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).

PLUNGER: Thermoplastic polyester (UL 94V-0).

CAP & FRAME: Nylon, black standard.

BUSHING: Brass, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass, matte-tin plated.

END CONTACTS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Coin silver, silver plated. See page A-19 for additional contact materials.

CENTER CONTACT & ALL TERMINALS: B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page A-19 for additional contact materials.

TERMINAL SEAL: Epoxy. Refer to soldering and cleaning in Technical Data Chapter

HARDWARE: Nut & Locking Ring: Brass nickel plated. Lockwasher: Steel, nickel plated.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-16 thru A-20. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.

<p>Switch Function</p> <p>TP11 SPST Off-Mom.</p> <p>TP12 SPDT On-Mom.</p> <p>TP21 DPST Off-Mom.</p>	<p>Actuator or Bushing</p> <p>SH .155" high plunger, threaded, .220" high bushing, flat</p> <p>SH8 .155" high plunger, unthreaded, .220" high bushing, round</p> <p>SH9 .155" high plunger, unthreaded, .220" high bushing, flat</p> <p>J81 Snap-in with frame</p> <p>LT .215" high plunger, threaded, .310" high bushing, flat</p> <p>LT9 .215" high plunger, unthreaded, .310" high bushing, flat</p> <p>MS9 .130" high plunger, .020" high bushing, round</p>	<p>Terminations</p> <p>A Right angle, PC thru-hole</p> <p>C PC Thru-hole</p> <p>Z Solder lug</p> <p>AV Vertical right angle, PC thru-hole</p> <p>V3 Vertical mount, v-bracket</p> <p>W Wire wrap</p>	<p>Seal</p> <p>E Epoxy</p>	<p>Cap Color</p> <p>2 Black</p> <p>NONE Models with no cap</p> <p>1 White</p>	<p>Frame Color</p> <p>2 Black</p> <p>NONE Models with no frame</p>
<p>Contact Material</p> <p>B Gold</p> <p>P Gold, matte-tin</p> <p>Q Silver</p> <p>G Gold over silver</p> <p>R Gold over silver, matte-tin</p>					



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



TP Series Tiny Pushbutton Switches

SWITCH FUNCTION



A

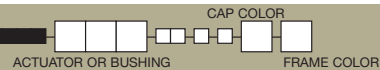
Pushbutton

NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
		C&K marking on opposite side		C&K marking on opposite side		
SP	TP11	OFF	MOM.	OPEN	1-3	SPST
	TP12	ON	MOM.	2-1	2-3	SPDT
SPDT Part number shown: TP12SHZQE Terminal Nos. For Reference Only						
DP	TP21	OFF	MOM.	OPEN	1-3,4-6	DPST
DPST Part number shown: TP21SHZQE Terminal Nos. For Reference Only						

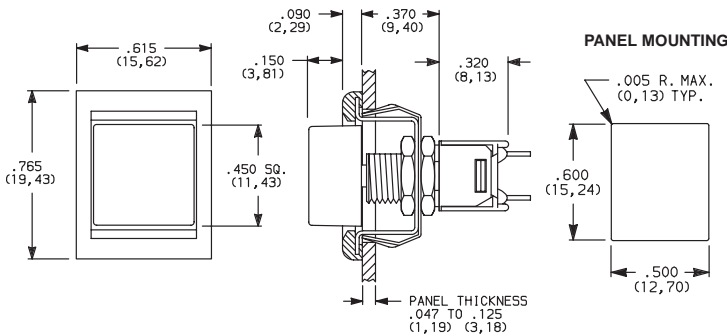
MOM. = Momentary

All models with all options when ordered with G, L, Q or R contact material.

ACTUATOR—SNAP-IN FRONT MOUNT



J81 SNAP-IN WITH FRAME

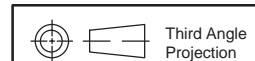


OPTION CODE	CAP COLOR
2	BLACK
1	WHITE

OPTION CODE	FRAME COLOR
2	BLACK
NONE	No Frame Color (J80 option)

Cap and Frame Finish: matte. Other colors available, consult Customer Service Center.
NOTE: Available with Z, C, or W terminations.

NOTE: Caps & frames available separately, see page A-18.



Dimensions are shown: Inches (mm)
 Specifications and dimensions subject to change

TP Series Tiny Pushbutton Switches



A

Pushbutton

SH .155" HIGH PLUNGER,
.220" HIGH BUSHING,
THREADED, FLAT

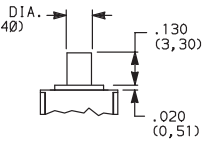
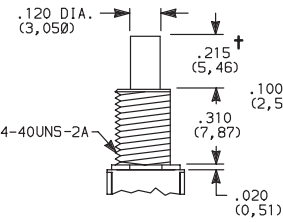
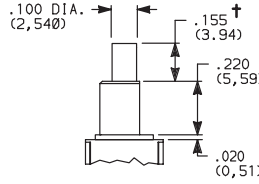
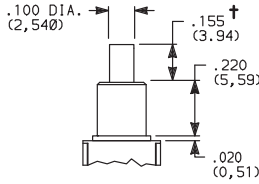
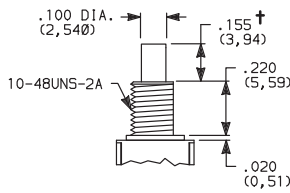
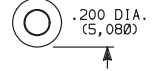
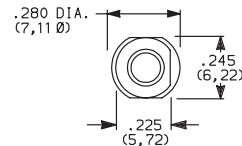
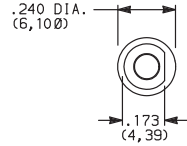
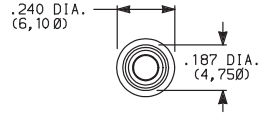
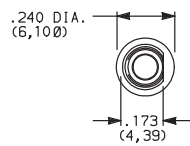
SH8 .155" HIGH PLUNGER,
.220" HIGH BUSHING,
UNTHREADED

SH9 .155" HIGH PLUNGER,
.220" HIGH BUSHING,
UNTHREADED, FLAT

LT .215" HIGH PLUNGER,
.310" HIGH BUSHING,
THREADED

MS9 .130" HIGH
PLUNGER

LT9 .215" HIGH PLUNGER,
.310" HIGH BUSHING,
UNTHREADED



Standard with Z, C, W terminations.

Standard with A, AV, V3 terminations.

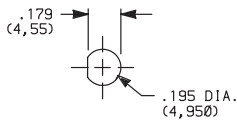
Not available with
Z terminations.

† Subtract .016 (0,41) for models with A, AV or V3 terminations.

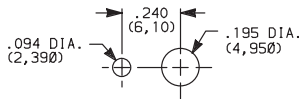
NOTE: Caps available for plunger options, see page A-20.

PANEL MOUNTING

10-48 BUSHING

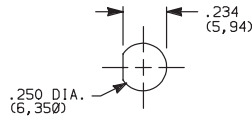


Without locking ring

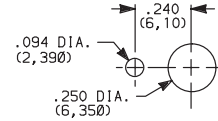


With standard locking ring

1/4 IN. BUSHING



Without locking ring



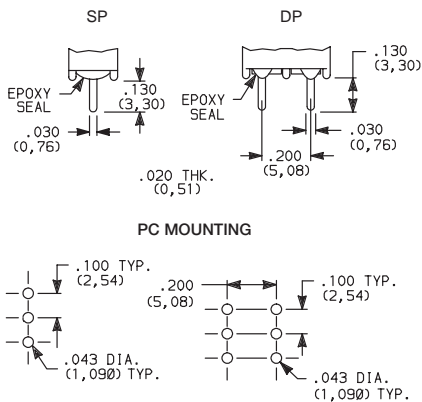
With standard locking ring

NOTE: One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings).
Optional mounting nut and locking ring styles and finishes available separately, see section "Technical Data and Additional Hardware".

TERMINATIONS

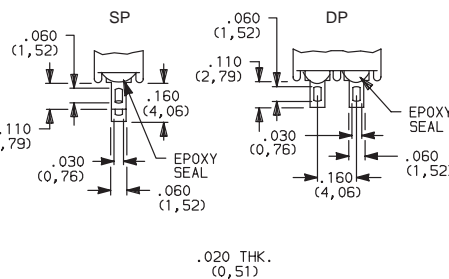


C PC THRU-HOLE



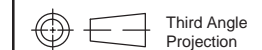
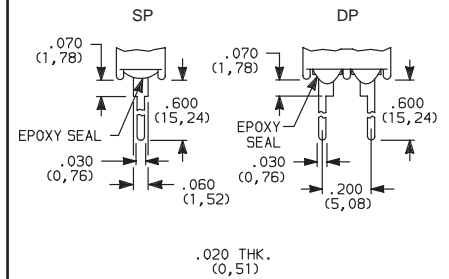
Omit center holes
for TP11 models

Z SOLDER LUG



Not available with MS9 bushing or P
or R contact material.

W WIRE WRAP



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





TP Series Tiny Pushbutton Switches

TERMINATIONS



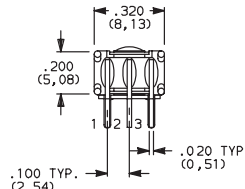
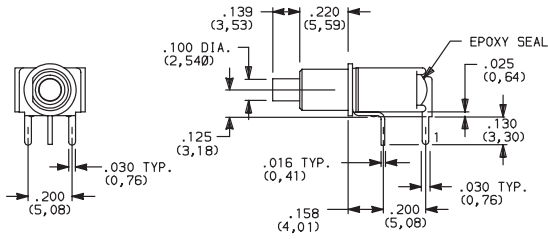
Pushbutton

A

A RIGHT ANGLE, PC THRU-HOLE

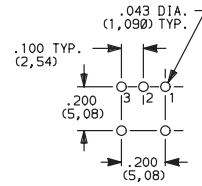


**TP12SH9ABE
SPDT**



**TP11 Models:
omit terminal 2.**

PC MOUNTING

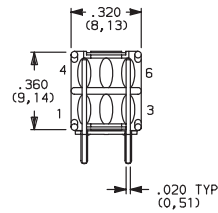
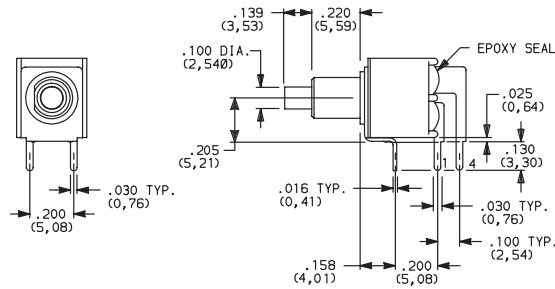


**TP11 Models:
omit hole 2.**

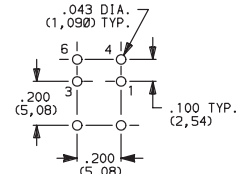
A RIGHT ANGLE, PC THRU-HOLE



**TP21SH9ABE
DPST**



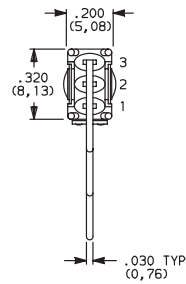
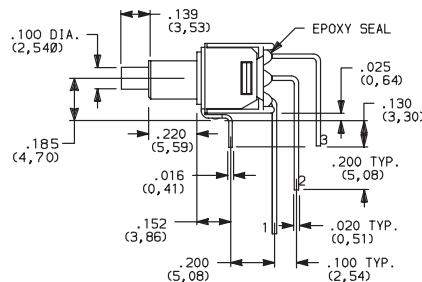
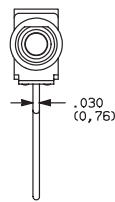
PC MOUNTING



AV VERTICAL RIGHT ANGLE, PC THRU-HOLE

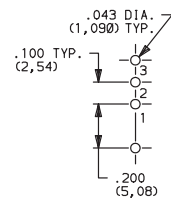


**TP12SH9AVBE
SPDT**



**TP11 Models:
omit terminal 2.**

PC MOUNTING



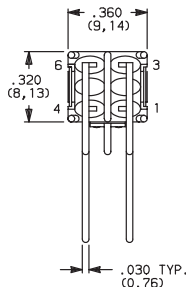
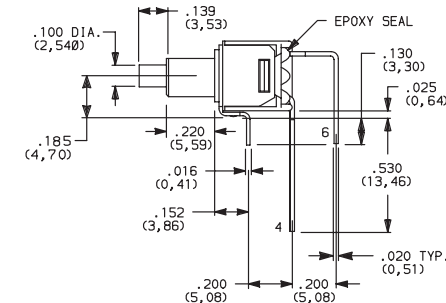
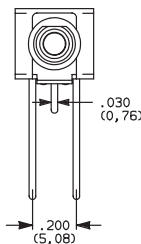
**TP11 Models:
omit hole 2.**

NOTE: Terminal bend radii and lead-in manufacturing option.

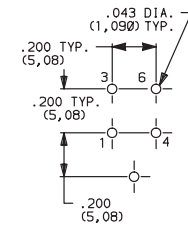
AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



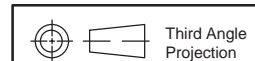
**TP21SH9AVBE
DPST**



PC MOUNTING



NOTE: Terminal bend radii and lead-in manufacturing option.



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



TP Series Tiny Pushbutton Switches

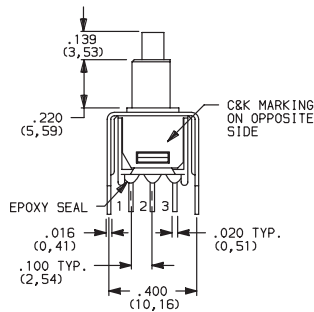


A

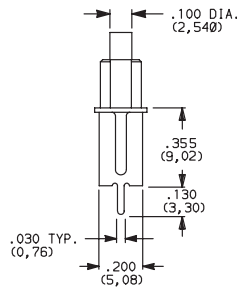
Pushbutton

TERMINATIONS

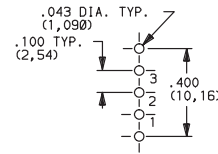
V3 VERTICAL MOUNT, V-BRACKET



TP11 Models:
omit terminal 2.



PC MOUNTING

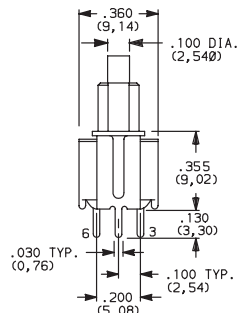
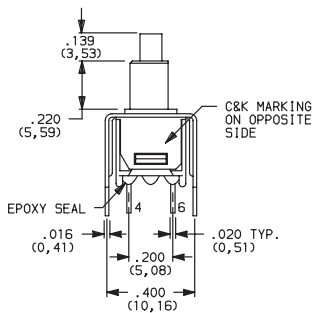


TP11 Models:
omit hole 2.

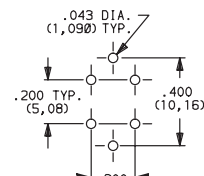


TP12SH9V3BE
SPDT

V3 VERTICAL MOUNT, V-BRACKET



PC MOUNTING



TP21SH9V3BE
DPST

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	1 AMP @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
R		MATTE-TIN ⁶		

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, with gold plate over nickel plate.
- CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- END CONTACTS: Coin silver, silver plated.
- CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- TERMINALS: Copper alloy, with matte-tin over nickel plate.

NOTE: Any models supplied with P, R, Q, B or G contact material are RoHS compliant.

All models with all options when ordered with R, G, L or Q contact material. B contact material standard with A, AV, V3 & W terminations.

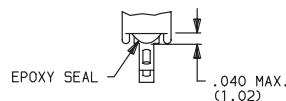
Q contact material standard with C & Z terminations

P, R contact materials not available with Z terminations.

K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

SEAL

E EPOXY SEAL



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



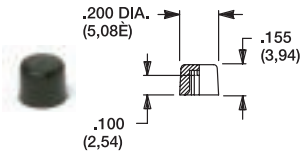


TP Series Tiny Pushbutton Switches

AVAILABLE HARDWARE

Pushbutton
A

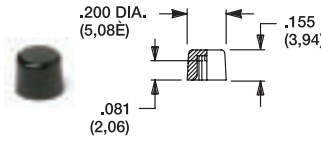
Cap, .100" DIA. Plungers



PART NO.
508101000 WHITE
508102000 BLACK

Material: Nylon
 Finish: Gloss

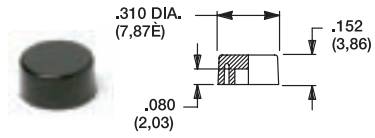
Cap, .100" DIA. Plungers (Recommended for S9 plunger)



PART NO.
538701000 WHITE
538702000 BLACK

Material: Nylon
 Finish: Gloss

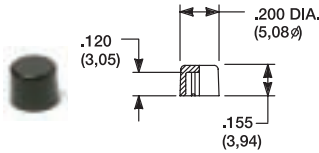
Cap, .100" DIA. Plungers



PART NO.
465801000 WHITE
465802000 BLACK

Material: Nylon
 Finish: Gloss

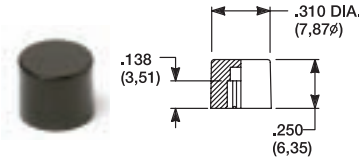
Cap, .120" DIA. Plungers



PART NO.
708901000 WHITE
708902000 BLACK

Material: Nylon
 Finish: Gloss

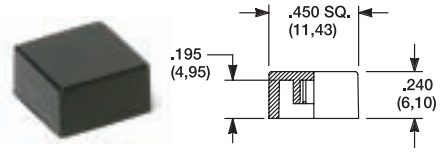
Cap, .120" DIA. Plungers



PART NO.
801801000 WHITE
801802000 BLACK

Material: Nylon
 Finish: Gloss

Cap, J81 option only



PART NO.
484601000 WHITE
484602000 BLACK

Material: Nylon
 Finish: Gloss

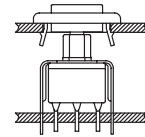
PART NO.
798201000 WHITE
798202263 BLACK

Material: Nylon
 Finish: Matte

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".
 Other cap colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

TYPICAL APPLICATION

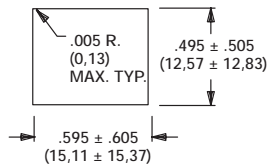


.047" (1,19) PANEL THK. .062" (1,57) PANEL THK. .090" (2,29) PANEL THK. .125" (3,18) PANEL THK.

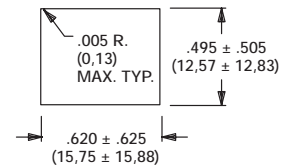
PART NO. **PART NO.** **PART NO.** **PART NO.**
432502263 **432602263** **432702263** **432802263** BLACK

PANEL MOUNTING

For part numbers
 432502263, 432602263

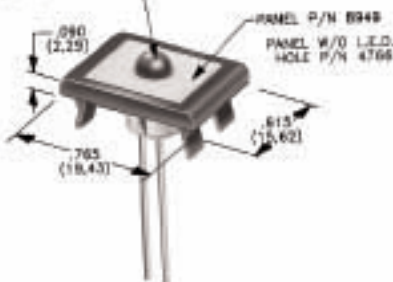


For part numbers
 432702263, 432802263



Panel Inserts

LED (.200 DIA. (5,08E)) SNAPS
 SECURELY INTO INSERT (P/N 8949).
 HEIGHT DEPENDS ON LED USED.



Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.

PANEL INSERT
 WITH HOLE FOR LED

PART NO.
894902000

BLANK PANEL INSERT
 WITHOUT HOLE FOR LED

PART NO.
476602000 BLACK



Dimensions are shown: Inches (mm)
 Specifications and dimensions subject to change

E020 Series Sealed Snap-acting Momentary Pushbutton Switches



Features/Benefits

- Process sealed with disposable splashproof boot
- Long life contact design
- Snap-fitting plunger available
- RoHS compliant models available

Typical Applications

- Instrumentation
- Telecommunications and networking equipment
- Computers and peripherals



Models Available

Specifications

CONTACT RATING: B contact material (EX25 Models): 0.4 VA max. @ 20 V AC or DC max. G contact material (EX21 Models): 1 AMP @120 V AC or 28 V DC or 0.4 VA max. @ 20 V AC or DC max. Note: Break-before-make contacts. Multi-pole contacts do not make and break simultaneously. See page A-26 for additional ratings.

ELECTRICAL LIFE: 60,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹Ω min.

DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 75°C.

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

NOTE: Any models supplied with P, R, B or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE & BUSHING: Glass filled nylon 6/6, flame retardant (UL 94V-0).

PLUNGER: Glass filled nylon or glass filled polyester (PBT) (UL 94V-0).

SWITCH SUPPORT: Brass or steel, matte-tin.

SWITCH SUPPORT RETAINER: Stainless steel.

N.O. & N.C. CONTACTS: EX25 MODELS: B contact material: Copper alloy, with gold plate over nickel plate. EX21 MODELS: G contact material: Coin silver, with gold plate over nickel plate. See page A-26 for additional contact materials.

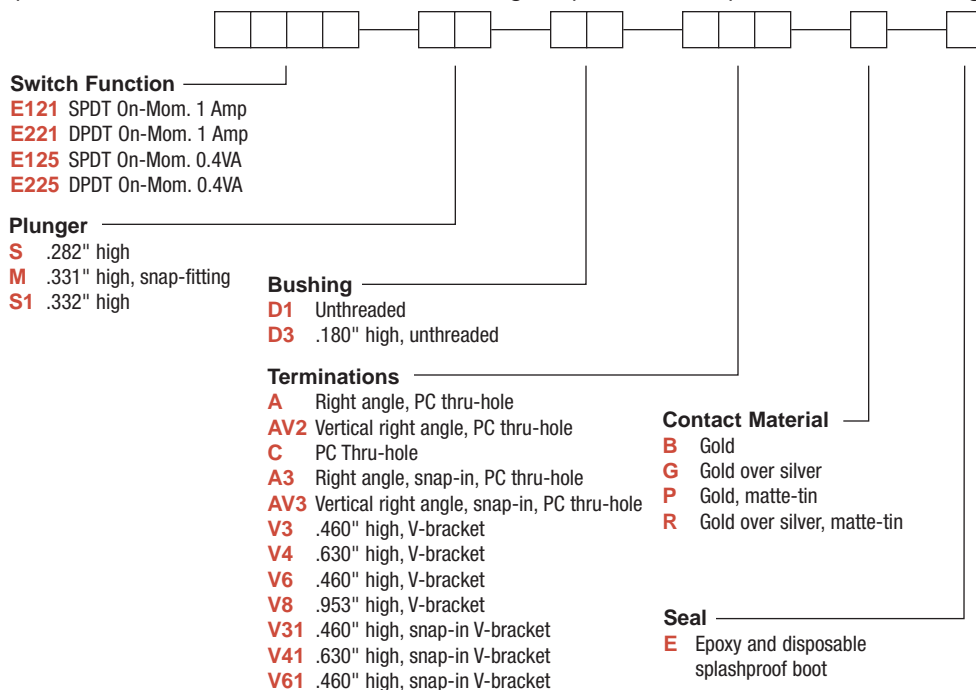
COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate. See page A-26 for additional contact materials.

TERMINAL SEAL: Epoxy.

DISPOSABLE BOOT: Vinyl splashproof boot supplied standard. Remove and discard only after soldering and cleaning processes are complete.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-22 thru A-28. For additional options not shown in catalog, consult our Customer Service Center. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



E020 Series Sealed Snap-acting Momentary Pushbutton Switches

SWITCH FUNCTION

Pushbutton

NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	E121	ON	MOM.	1-3	1-2	
	E125	ON	MOM.			
<p>SPDT</p> <p>Part number shown: E121SD1CGE</p>						
DP	E221	ON	MOM.	1-3,4-6	1-2,4-5	
	E225	ON	MOM.			
<p>DPDT</p> <p>Part number shown: E221SD1CBE</p>						

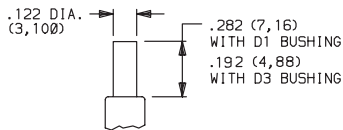
MOM. = Momentary

E121, E221 models with all options when ordered with G, L or R contact material.

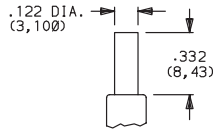
EX25 models must be ordered with B or P contact material.
EX21 models must be ordered with G or R contact material.

PLUNGER

S .282" HIGH

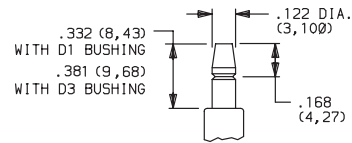


S1 .332" HIGH



Not Available with D1 bushing.

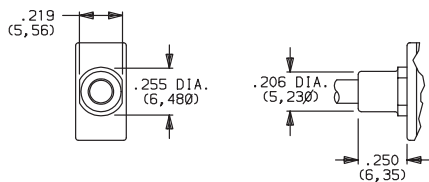
M .332" HIGH SNAP-FITTING



NOTE: Caps available for all plunger options, see page A-27.

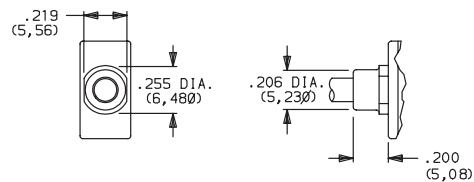
BUSHING

D1 UNTHREADED

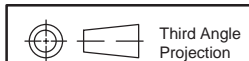


Not available with S1 actuator.

D3 .180" HIGH UNTHREADED



NOTE: Disposable splashproof vinyl over actuator and bushing supplied std., see page A-26.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



E020 Series Sealed Snap-acting Momentary Pushbutton Switches



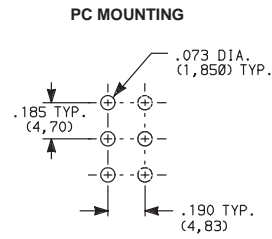
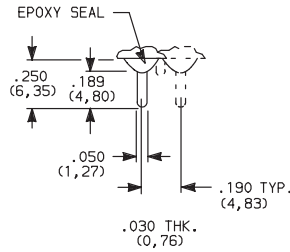
A

Pushbutton

TERMINATIONS

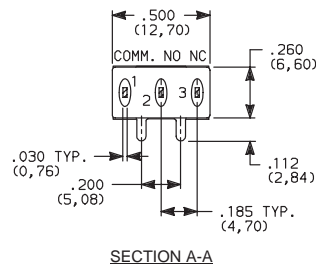
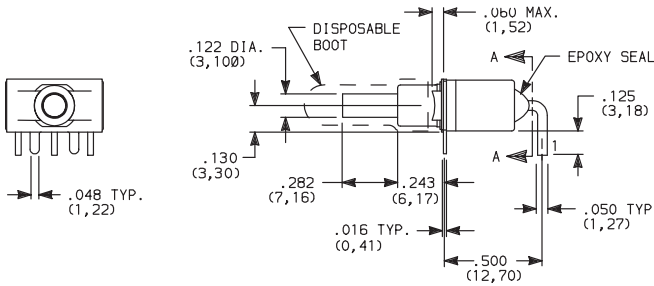


C PC THRU-HOLE



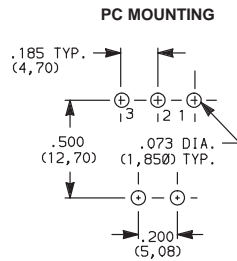
SPDT and DPDT

A RIGHT ANGLE, PC THRU-HOLE



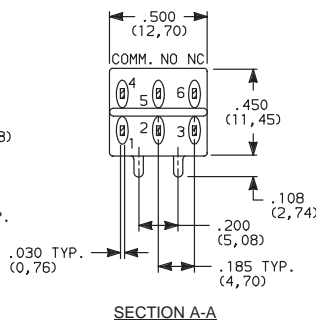
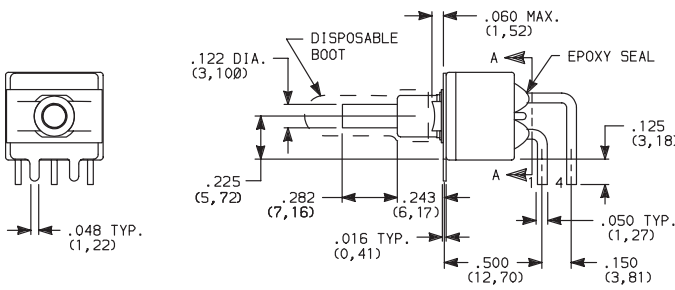
E121SD1AGE SPDT

A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



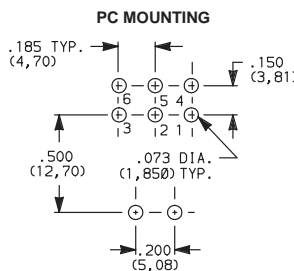
NOTE: Terminal bend radii and lead-in manufacturing option.

A RIGHT ANGLE, PC THRU-HOLE

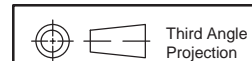


E221SD1AGE DPDT

A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



NOTE: Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





E020 Series Sealed Snap-acting Momentary Pushbutton Switches

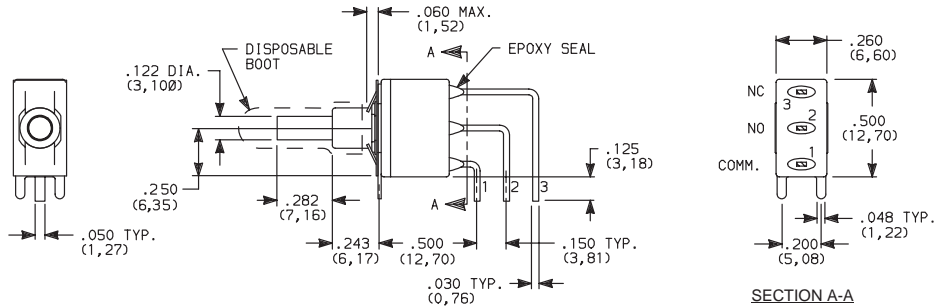
TERMINATIONS

Pushbutton
A

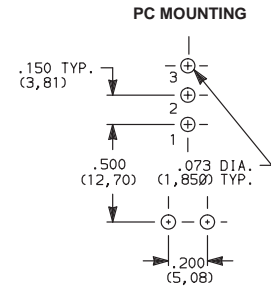
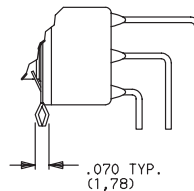
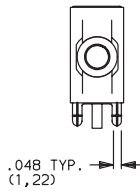
AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE,
.150" PITCH



**E121SD1AV2GE
SPDT**



AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE,
.150" PITCH

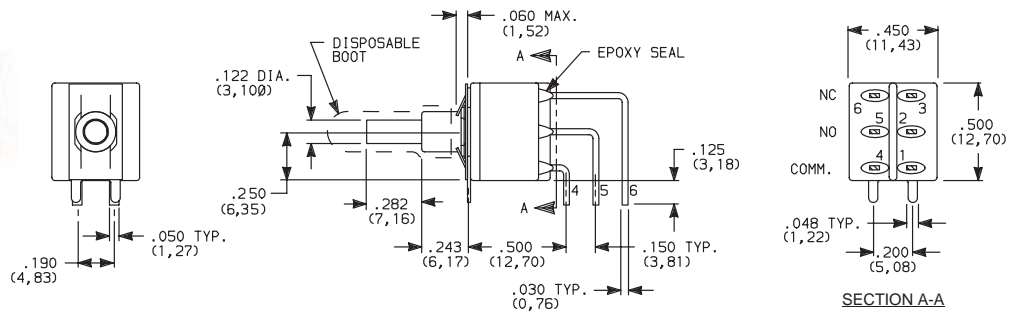


NOTE: Terminal bend radii and lead-in manufacturing option.

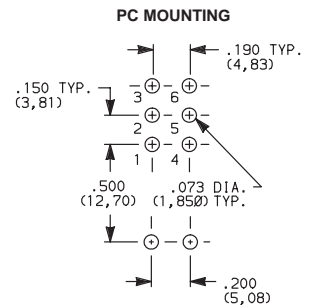
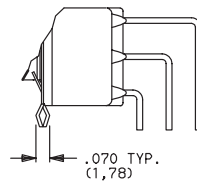
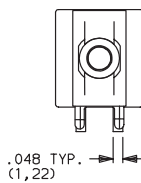
AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE,
.150" PITCH



**E221SD1AV2GE
DPDT**



AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE,
.150" PITCH



NOTE: Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

E020 Series Sealed Snap-acting Momentary Pushbutton Switches



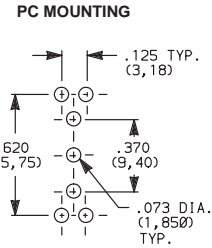
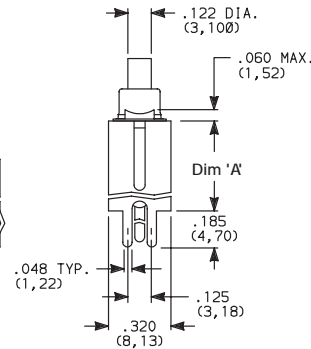
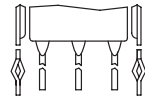
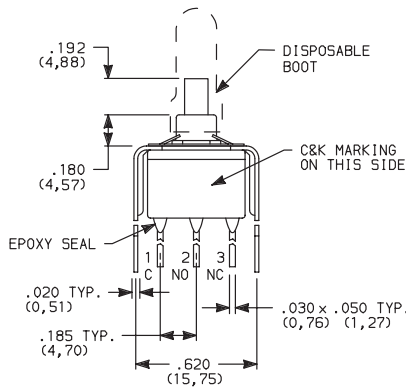
A

Pushbutton

TERMINATIONS

V3, V4 VERTICAL MOUNT, V-BRACKET

V31, V41 VERTICAL MOUNT, V-BRACKET, SNAP-IN

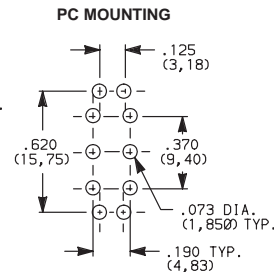
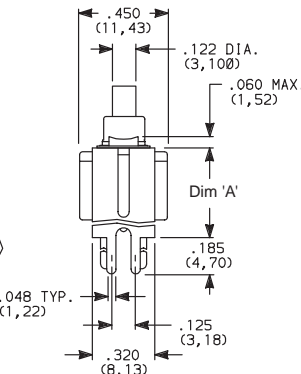
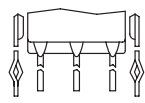
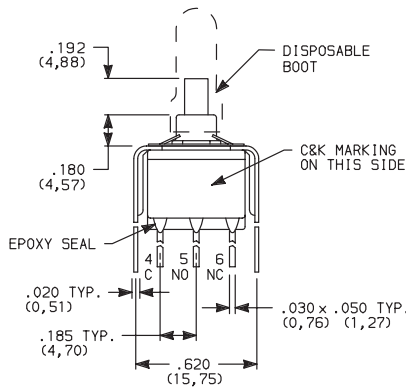


E121SD3_GE SPDT

OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)

V3, V4 VERTICAL MOUNT, V-BRACKET

V31, V41 VERTICAL MOUNT, V-BRACKET, SNAP-IN

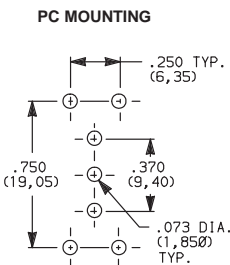
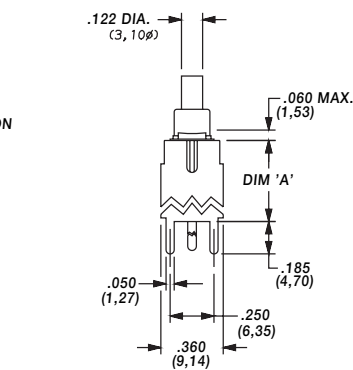
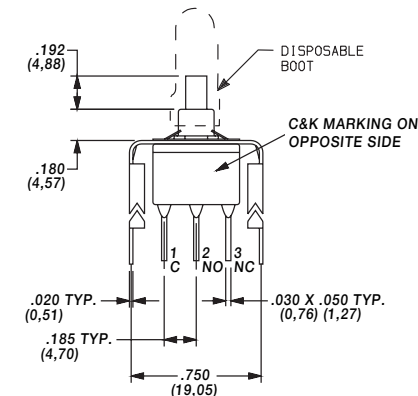


E221SD3_GE DPDT

OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)

V6, V8 VERTICAL MOUNT, V-BRACKET

V61, V81 VERTICAL MOUNT, V-BRACKET, SNAP-IN



E121SD3_GE SPDT

OPTION CODE	DIM 'A'
V6, V61	.460 (11,68)
V8, V81	.953 (24,21)



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





E020 Series Sealed Snap-acting Momentary Pushbutton Switches

TERMINATIONS

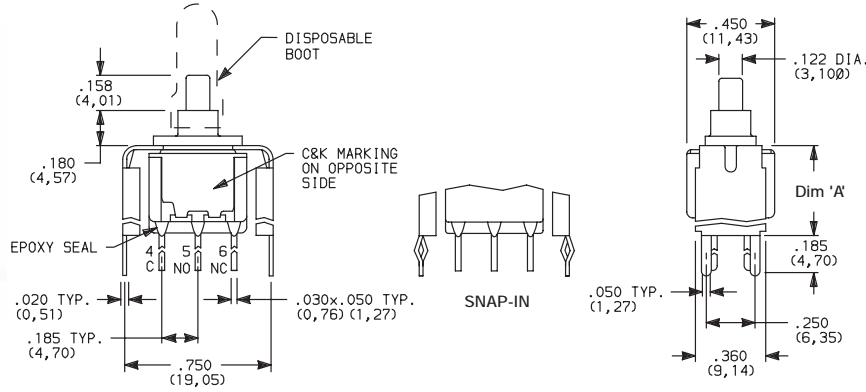
Pushbutton
A

V6, V8 VERTICAL MOUNT, V-BRACKET

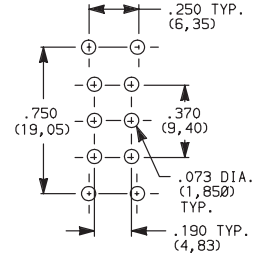
V61, V81 VERTICAL MOUNT, V-BRACKET, SNAP-IN



E221SD3V6GE
DPDT



PC MOUNTING



OPTION CODE	DIM 'A'
V6, V61	.460 (11,68)
V8, V81	.953 (24,21)

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL/DRY CIRCUIT	EX25 MODELS ONLY: 0.4 VA MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN ⁴		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	EX21 MODELS ONLY: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
R		MATTE-TIN ⁴		

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- ¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- ⁴ TERMINALS: Copper alloy, with matte-tin alloy over nickel plate.

NOTE: Any models supplied with P, R, B or G contact material are RoHS compliant.

E121, E221 models with all options when ordered with mandatory G, R or L contact material.

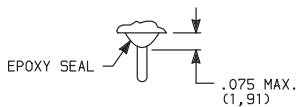
P or B contact material must be ordered with EX25 models.

R or G contact material must be ordered with EX21 models.

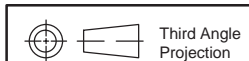
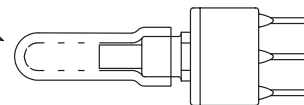
K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

SEAL

E EPOXY SEAL AND DISPOSABLE SPLASHPROOF BOOT



Disposable splashproof boot supplied standard. Remove and discard boot *only after* soldering and cleaning processes are complete.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

E020 Series Sealed Snap-acting Momentary Pushbutton Switches

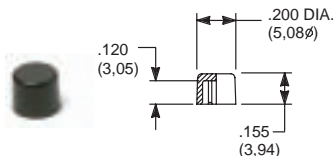


A

Pushbutton

AVAILABLE HARDWARE

Cap

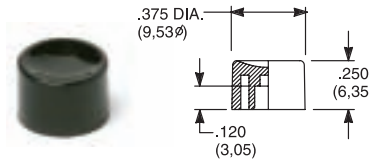


PART NO.

- 708901000** WHITE
- 708902000** BLACK
- 708903000** RED

Material: Nylon
Finish: Gloss

Cap

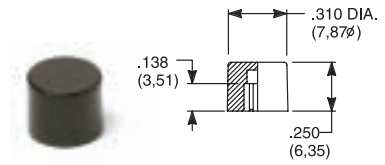


PART NO.

- 752701000** WHITE
- 752702000** BLACK
- 752703000** RED

Material: Nylon
Finish: Gloss

Cap

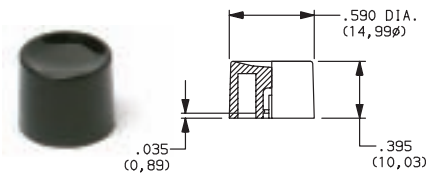


PART NO.

- 801801000** WHITE
- 801802000** BLACK
- 801803000** RED

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

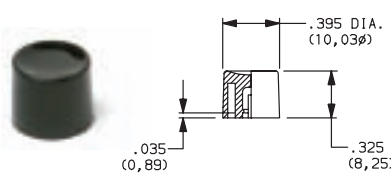


PART NO.

- 894001000** WHITE
- 894002000** BLACK
- 894003000** RED

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

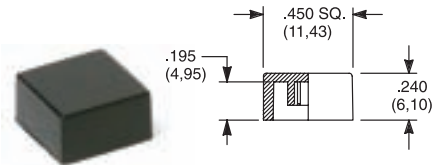


PART NO.

- 894101000** WHITE
- 894102000** BLACK
- 894103000** RED

Material: Nylon
Finish: Gloss

Cap



PART NO.

- 484601000** WHITE
- 484602000** BLACK
- 484603000** RED

Material: Nylon
Finish: Gloss

PART NO.

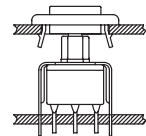
- 798201000** WHITE
- 798202263** BLACK
- 798203000** RED

Material: Nylon
Finish: Matte

NOTE: Other cap colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

TYPICAL APPLICATION



.047" (1,19) PANEL THK. .062" (1,57) PANEL THK. .090" (2,29) PANEL THK. .125" (3,18) PANEL THK.

PART NO.

- 432501000**
- 432502263**
- 432503000**

PART NO.

- 432601000**
- 432602263**
- 432603000**

PART NO.

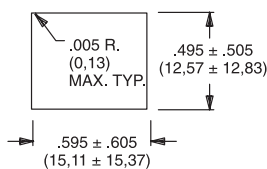
- 432701000**
- 432702263**
- 432703000**

PART NO.

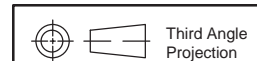
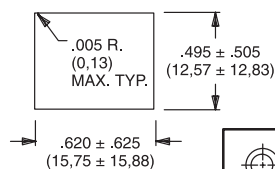
- 432801000** WHITE
- 432802263** BLACK
- 432803000** RED

PANEL MOUNTING

For part numbers
4325xxxxx, 4326xxxxx



For part numbers
4327xxxxx, 4328xxxxx



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





E020 Series Sealed Snap-acting Momentary Pushbutton Switches

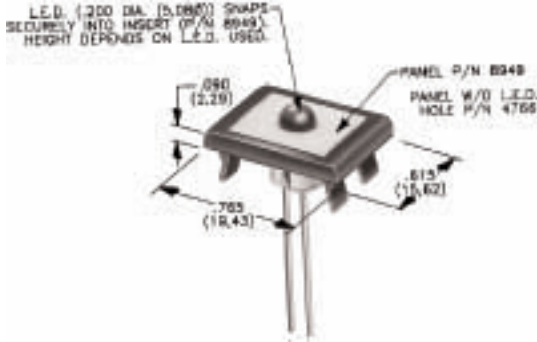
AVAILABLE HARDWARE

A

Pushbutton

PANEL INSERTS

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT
WITH HOLE FOR LED

BLANK PANEL INSERT
WITHOUT HOLE FOR LED

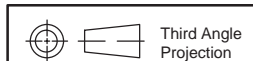
PART NO.

894901000
894902000
894903000

PART NO.

476601000 WHITE
476602000 BLACK
476603000 RED

Special colors, custom markings available, consult Customer Service Center.



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change

8020 Series Snap-acting Momentary Pushbutton Switches



A

Pushbutton

Features/Benefits

- **Positive tactile feel**
- **Multi-positions available**
- **Wide variety of termination options**
- **Epoxy terminal seal compatible with bottom wash cleaning**
- **RoHS compliant models available**

Typical Applications

- **Instrumentation**
- **Computer peripherals**
- **Telecommunications equipment**



Models Available

Specifications

CONTACT RATING: B contact material (8X25 Models): 0.4 VA max. @ 20 V AC or DC maximum. G contact material (8X21, U8X1 Models): 1 AMP @ 120 V AC or 28 V DC or 0.4 VA max. @ 20 V AC or DC max. Note: Break-before-make contacts. Multi-pole contacts do not make and break simultaneously. See page A-43 for additional ratings.

ELECTRICAL LIFE: 60,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: 8X2X MODELS: -30°C to 75°C. U8X1 MODELS: -30°C to 65°C.

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

NOTE: Any models supplied with B, P, R, or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE: Glass filled nylon 6/6 or diallyl phthalate (DAP), flame retardant (UL 94V-0).

PLUNGER: Glass filled nylon or glass filled polyester (PBT) (UL 94V-0).

CAP & FRAME: Nylon, black, standard.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, matte-tin plated.

N.O. & N.C. CONTACTS: 8X21, U8X1 MODELS: G contact material: Coin silver, with gold plate over nickel plate. See page A-43 for additional contact materials.

8X25 MODELS: B contact material: Copper alloy, with gold plate over nickel plate. See page A-43 for additional contact materials.

COMMON CONTACT & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

TERMINAL SEAL: Epoxy. Refer to soldering and cleaning Technical Data Chapter.

HARDWARE: Nut & Locking Ring: Brass, nickel plated; Lockwasher: Steel, nickel plated.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-30 thru A-45. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



Switch Function

- 8121** SPDT On-Mom. 1 Amp
- 8125** SPDT On-Mom. 0.4VA
- 8221** DPDT On-Mom. 1 Amp
- 8225** DPDT On-Mom. 0.4VA
- 8321** 3PDT On-Mom. 1 Amp
- 8325** 3PDT On-Mom. 0.4VA
- 8421** 4PDT On-Mom. 1 Amp
- 8425** 4PDT On-Mom. 0.4VA

Note: UL/CSA models available, see page A-30 and A-31.

Actuator or Plunger

- S** Plunger
- NONE** Snap-in
- J80** Snap-in
- J81** Snap-in w/frame
- J82** Snap-in w/frame for LED
- J83** Snap-in w/frame & flush cap
- J84** Snap-in w/frame for LED, flush cap
- J85** Snap-in w/frame & LED
- J95** PC w/V-bracket & LED
- L** Plunger
- M** Snap-fitting plunger

Bushing

- D9** .280" high, keyway
- H** .250" high, flat
- NONE** No bushing choice required
- D** .280" high, keyway
- D2** .288" high, flat
- D3** .180" high
- D8** .288" high, flat
- H9** .250" high, flat, hi torque
- Y** .350" high, keyway
- Y3** 6.35mm high, keyway, hi torque
- Y4** .378" high, flat, hi torque
- Y9** .350" high, keyway

Contact Material

- B** Gold
- P** Gold, matte-tin
- G** Gold over silver
- R** Gold over silver, matte-tin

Seal

- E** Epoxy
- I** Epoxy potted base

Cap Color

- 2** Black
- NONE** Models without caps
- 1** White
- 3** Red
- 4** Orange
- 5** Yellow
- 6** Green
- 7** Blue
- 9** Gray

Frame Color

- 2** Black
- NONE** Models without frame
- 1** White
- 3** Red
- 5** Yellow
- 6** Green
- 9** Gray

LED Color

- 3** Red
- NONE** Models without LED
- 5** Yellow
- 6** Green

Terminations

- A** Right angle, PC thru-hole
- AV2** Vertical right angle, PC thru-hole
- C** PC Thru-hole
- Z** Solder lug
- A2** Right angle, PC thru-hole
- A3** Right angle, snap-in, PC thru-hole
- A4** Right angle, PC thru-hole, reversed terminals
- A6** Right angle, PC thru-hole
- AV** Vertical right angle, PC thru-hole
- AV1** Vertical right angle, PC thru-hole
- AV3** Vertical right angle, snap-in, PC thru-hole
- R** Right angle with PCB
- R2** Right angle with PCB, reversed terminals
- V2** .555" high, V-bracket
- V3** .460" high, V-bracket
- V4** .630" high, V-bracket
- V6** .460" high, V-bracket
- V7** .630" high, V-bracket
- V8** .953" high, V-bracket
- V9** 1.150" high, V-bracket
- V31** .460" high, snap-in V-bracket
- V61** .460" high, snap-in V-bracket
- W** .750" long, wire wrap
- W1** .964" long, wire wrap
- W3** .425" long, wire wrap
- W4** 1.062" long, wire wrap
- Z3** Quick connect

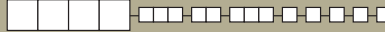


Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8020 Series Snap-acting Momentary Pushbutton Switches

SWITCH FUNCTION



Pushbutton

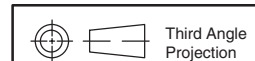
NO. POLES	MODEL NO.	UL/CSA* MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
			POS. 1	POS. 2	POS. 1	POS. 2	
SP	8121	U811	ON	MOM.	1-3	1-2	
	8125		ON	MOM.			
<p>SPDT</p> <p>Part number shown: 8121SHZGE</p>							
DP	8221	U821	ON	MOM.	1-3,4-6	1-2,4-5	
	8225		ON	MOM.			
<p>DPDT</p> <p>Part number shown: 8221SHZGE</p>							
3P	8321	U831	ON	MOM.	1-3,4-6,7-9	1-2,4-5,7-8	
	8325		ON	MOM.			
<p>3PDT</p> <p>Part number shown: 8321SHZGE</p>							

MOM. = Momentary

*U811 thru U841 model numbers with all options (except R, R2 terminations) when ordered with G, L or R contact material.

8X25 models must be ordered with B or P contact material.

8X21 and U8X1 models must be ordered with G or R contact material.



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change

8020 Series Snap-acting Momentary Pushbutton Switches



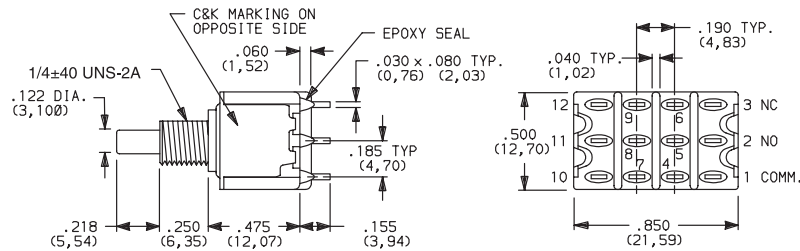
A

Pushbutton

SWITCH FUNCTION

NO. POLES	MODEL NO.	UL/CSA* MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
			POS. 1	POS. 2	POS. 1	POS. 2	
4P	8421	U841	ON	MOM.	1-3,4-6,7-9,10-12	1-2,4-5,7-8,10-11	
	8425		ON	MOM.			

4PDT



Part number shown: 8421SHZGE

Terminal Nos. For Reference Only

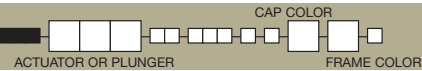
MOM. = Momentary

* U811 thru U841 model numbers with all options (except R, R2 terminations) when ordered with G, L or R contact material.

8X25 models must be ordered with B or P contact material.

8X21 and U8X1 models must be ordered with G or R contact material.

ACTUATOR—SNAP-IN FRONT MOUNT

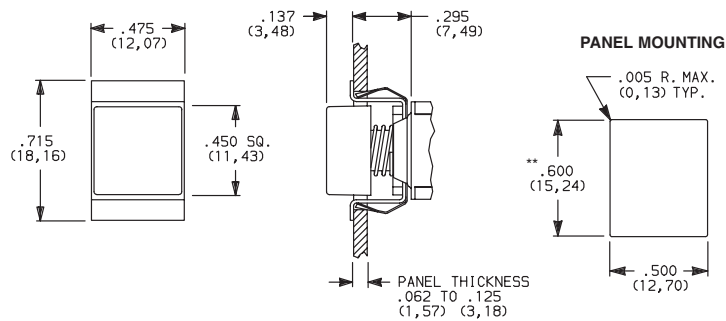


OPTION CODE	CAP AND FRAME COLOR
2	BLACK
NONE	No Frame Color (J80 option)
1	WHITE
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
9	GRAY

Other colors available, consult Customer Service Center. Cap and Frame Finish: matte.

NOTE: Caps and frames available separately, see pages A-44 and A-45.

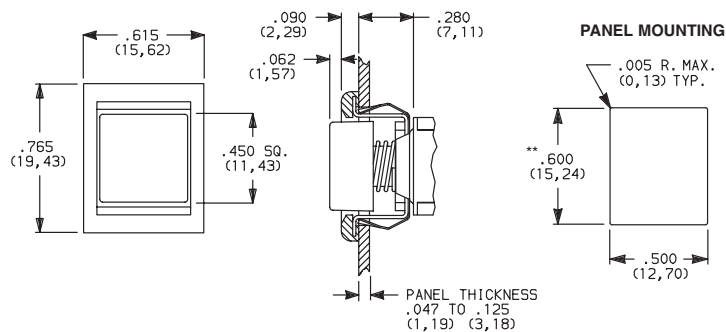
J80 SNAP-IN



NOTE: No frame color choice required.

** Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

J81 SNAP-IN WITH FRAME



NOTE: Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

** Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.



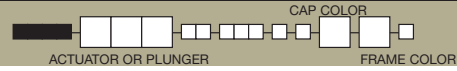
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





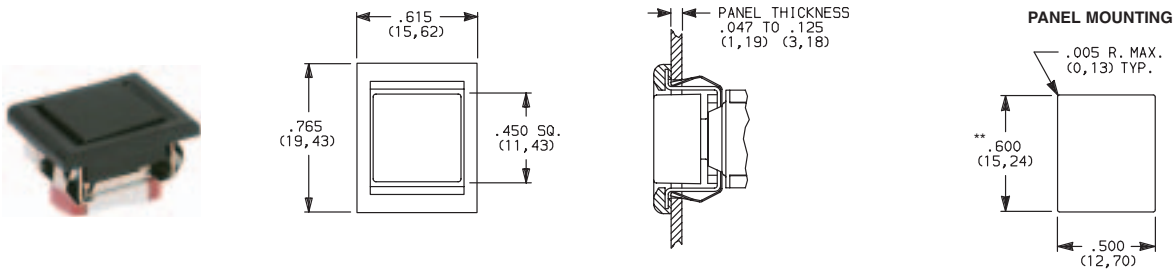
8020 Series Snap-acting Momentary Pushbutton Switches

ACTUATOR—SNAP-IN FRONT MOUNT

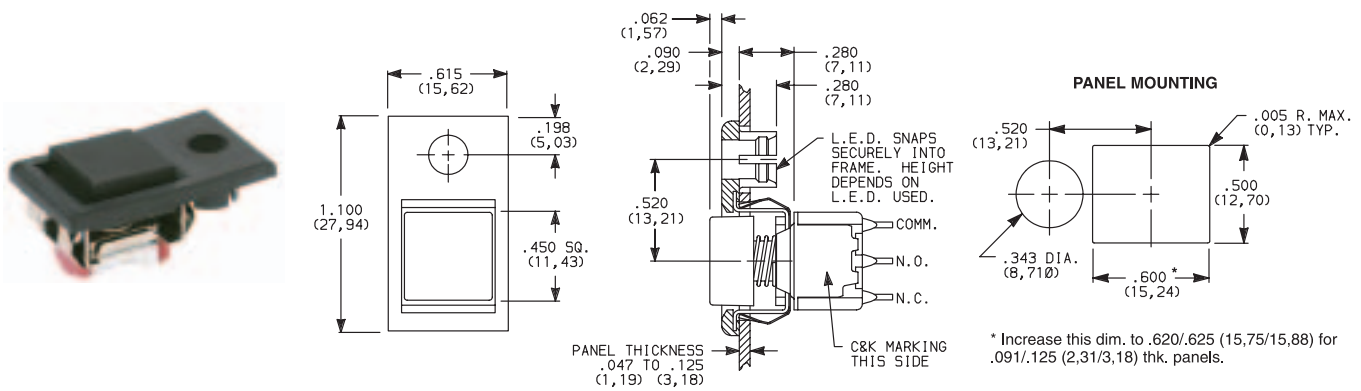


Pushbutton
A

J83 SNAP-IN WITH FRAME AND FLUSH CAP

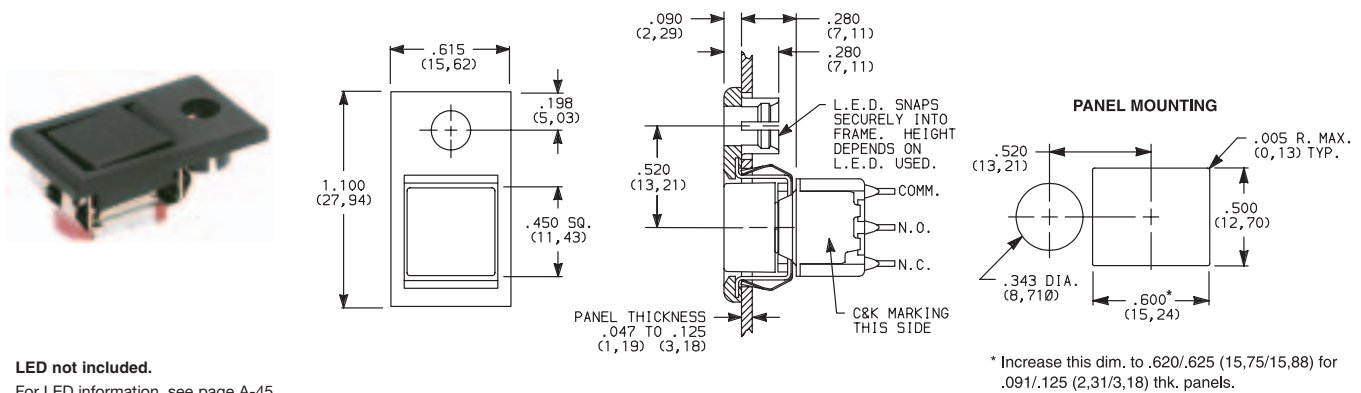


J82 SNAP-IN WITH FRAME FOR LED



LED not included.
For LED information, see page A-45.

J84 SNAP-IN WITH FRAME FOR LED, FLUSH CAP

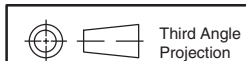


LED not included.
For LED information, see page A-45.

OPTION CODE	CAP AND FRAME COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
9	GRAY

Other colors available, consult Customer Service Center.
Cap and Frame Finish: matte.
Available with C, W-W4, Z or Z3 terminations and SPDT and DPDT models only.

NOTE: Caps and frames available separately, see pages A-44 and A-45.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



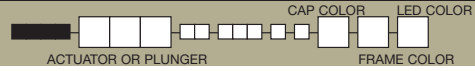
8020 Series Snap-acting Momentary Pushbutton Switches



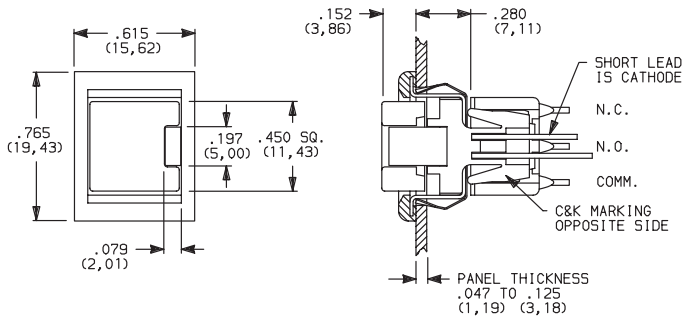
A

Pushbutton

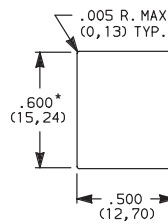
ACTUATOR—SNAP-IN FRONT MOUNT



J85 SNAP-IN WITH FRAME AND LED



PANEL MOUNTING



* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.



8121J85ZGE223
SPST

Available with C, W-W4, Z or Z3 terminations and SPDT models only. For LED information see page A-45.

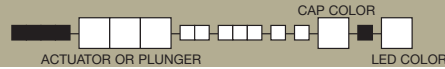
NOTE: Caps & frames available separately, see pages A-44 and A-45.

OPTION CODE	CAP AND FRAME COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
9	GRAY

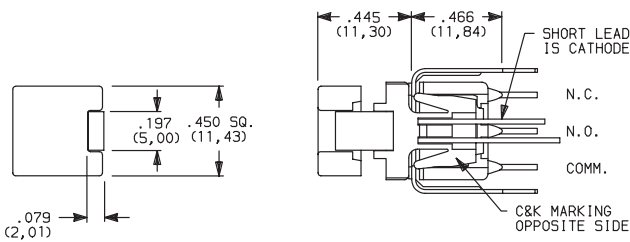
OPTION CODE	LED COLOR
3	RED
5	YELLOW
6	GREEN

For LED information see page A-43.

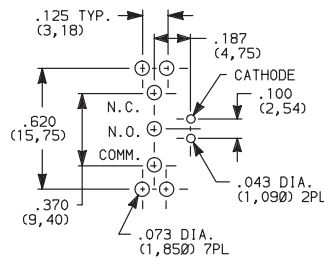
ACTUATOR—PC MOUNT



J95 PC WITH V-BRACKET AND LED



PC MOUNTING



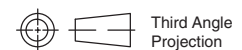
8121J95V3GE23
SPST

OPTION CODE	CAP AND FRAME COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
9	GRAY

OPTION CODE	LED COLOR
3	RED
5	YELLOW
6	GREEN

For LED information see page A-45.

NOTE: Caps available separately, see page A-44. Available with V3 terminations and SPDT models only.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8020 Series Snap-acting Momentary Pushbutton Switches

PLUNGER

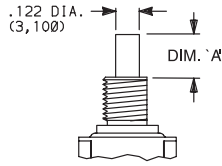


ACTUATOR OR PLUNGER

Pushbutton

A

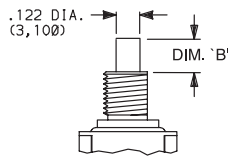
S PLUNGER



NONE NO PLUNGER CHOICE REQUIRED
(JXX ACTUATORS)

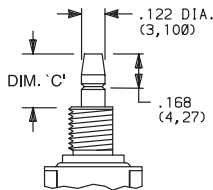
AVAILABLE BUSHINGS	DIM. 'A' FOR C, W-W4, Z & Z3 TERMINATIONS	DIM. 'A' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS	DIM. 'A' FOR V3-V61 TERMINATIONS
D, D9	.244 (6,20)	.228 (5,79)	.224 (5,69)
H, H9	.218 (5,54)	.202 (5,13)	.198 (5,03)
Y, Y9	.203 (5,16)	.187 (4,75)	.183 (4,65)
Y3	(5,54)	(5,13)	(5,03)
Y4	.185 (4,70)	.169 (4,29)	.165 (4,19)
D2, D8	N/A	.232 (5,89)	.228 (5,79)
D3	N/A	.162 (4,11)	.158 (4,01)

L PLUNGER



AVAILABLE BUSHINGS	DIM. 'B' FOR C, W-W4, Z & Z3 TERMINATIONS	DIM. 'B' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS	DIM. 'B' FOR V3-V61 TERMINATIONS
Y, Y9	.178 (4,52)	.162 (4,11)	.158 (4,01)
Y4	.090 (2,29)	.074 (1,88)	.070 (1,78)

M SNAP-FITTING PLUNGER



AVAILABLE BUSHINGS	DIM. 'C' FOR C, W-W4, Z & Z3 TERMINATIONS	DIM. 'C' FOR A, A2, A3, A4, A6, AV-A3, R & R2 TERMINATIONS	DIM. 'C' FOR V3-V61 TERMINATIONS
D, D9	.297 (7,54)	.281 (7,14)	.277 (7,04)
H, H9	.267 (6,78)	.251 (6,38)	.247 (6,27)
Y, Y9	.259 (6,58)	.243 (6,17)	.239 (6,07)
Y3	(6,78)	(6,37)	(6,27)
Y4	.259 (6,58)	.243 (6,17)	.239 (6,07)
D2, D8	N/A	.273 (6,93)	.269 (6,83)
D3	N/A	.361 (9,17)	.357 (9,07)

N/A = NOT AVAILABLE

NOTE: When selecting plunger option, bushing selection must also be made, see next page. No plunger option is required when any JXX actuator option is selected. Additional plunger lengths are available on SPDT and DPDT models, consult Customer Service Center. Not all plunger lengths sufficient for use with caps, see page A-44.

BUSHING



NONE NO BUSHING
CHOICE REQUIRED
(JXX ACTUATORS)

D .280" HIGH THREADED, KEYWAY

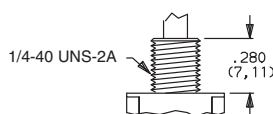
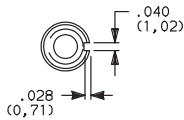
D9 .280" HIGH UNTHREADED,
KEYWAY

H .250" HIGH THREADED, FLAT

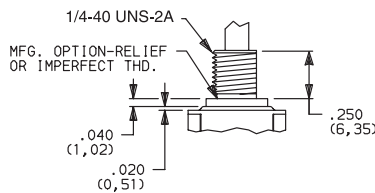
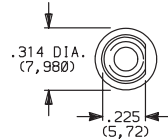
H9 .250" HIGH UNTHREADED, FLAT

Y .350" HIGH THREADED, KEYWAY

Y9 .350" HIGH UNTHREADED, KEYWAY

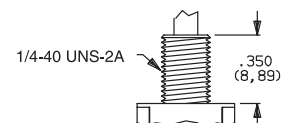
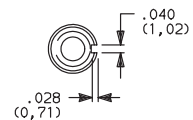


D9 bushing standard with A-A6,
R, R2 AV-AV3 terminations.



H bushing standard with C, W-W4, Z or Z3 terminations.
H, H9 bushings not available on single pole models with
A3-A6, R, R2 terminations.

**Will withstand 12 in./lbs. of torque with
no distortion.**



Third Angle
Projection

Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8020 Series Snap-acting Momentary Pushbutton Switches

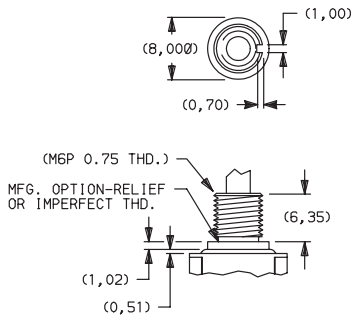


A

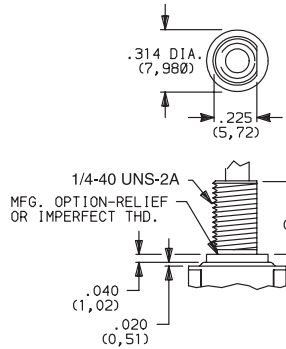
Pushbutton

BUSHING

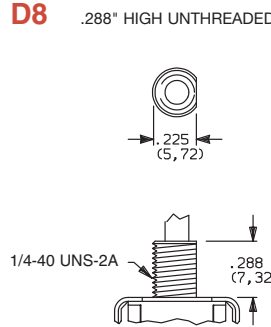
Y3 6.35mm THREADED, KEYWAY



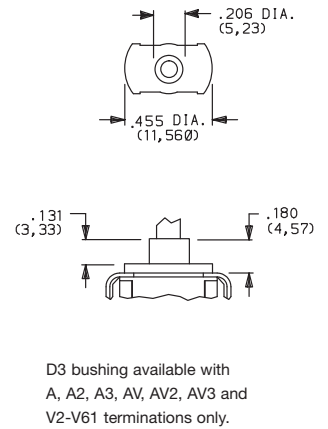
Y4 .378" HIGH THREADED, FLAT



D2 .288" HIGH THREADED, FLAT



D3 .180" HIGH UNTHREADED

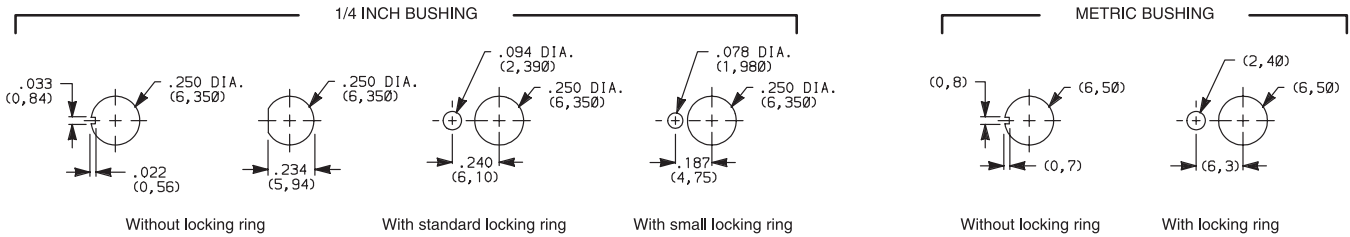


Y3 & Y4 bushings not available on single pole models with A3-A6, R, R2 terminations. Will withstand 12 in./lbs. of torque with no distortion.

D2, D8 bushings not available with C, W-W4, Z, Z3 terminations.

NOTE: No bushing option choice required when JXX actuator option is selected. When selecting bushing option, plunger selection must also be made, see previous page. Plunger lengths vary with bushing and termination options selected.

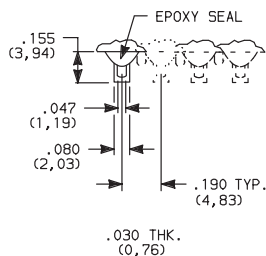
PANEL MOUNTING



NOTE: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles available, see section "Technical Data and Additional Hardware".

TERMINATIONS

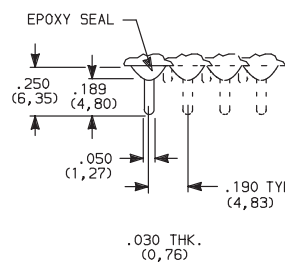
Z SOLDER LUG



SPDT thru 4PDT

Not available with J95 actuator, P or R contact material.

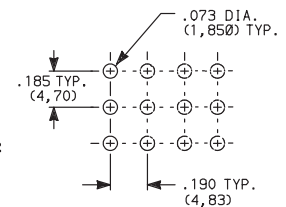
C PC THRU-HOLE



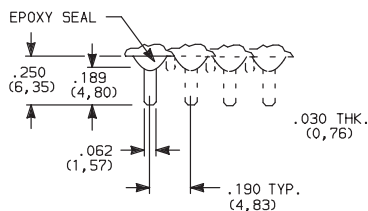
SPDT thru 4PDT

Not available with J95 actuator option.

PC MOUNTING



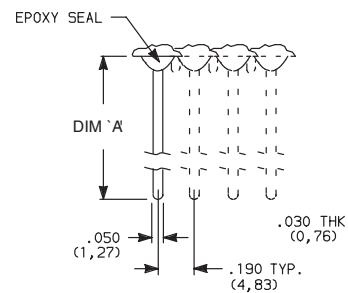
Z3 QUICK CONNECT



SPDT thru 4PDT

Not available with J95 actuator, P or R contact material. Mating quick connector available, order part number 530100000, page A-44.

W W1, W3, W4 WIRE WRAP



SPDT thru 4PDT

Not available with J95 actuator option.

OPTION CODE	DIM 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





8020 Series Snap-acting Momentary Pushbutton Switches

TERMINATIONS



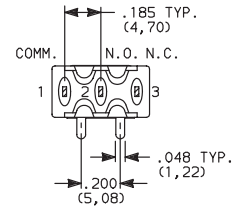
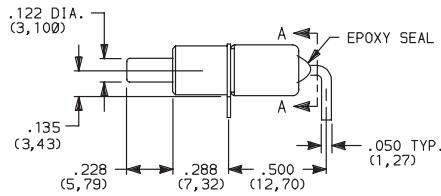
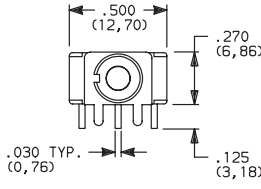
Pushbutton

A

A RIGHT ANGLE, PC THRU-HOLE

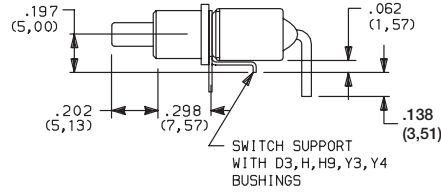


**8121SD9AGE
SPDT**



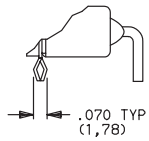
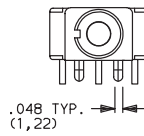
SECTION A-A

Terminal Nos.
For Reference Only.

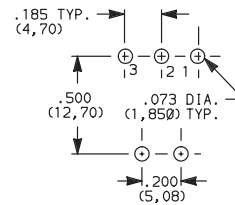


Part Number 8121SH9AGE

A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



PC MOUNTING

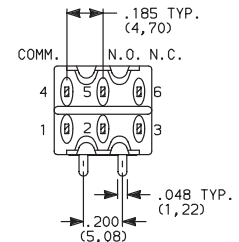
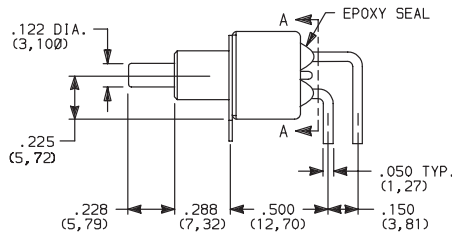
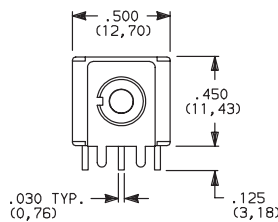


Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

A RIGHT ANGLE, PC THRU-HOLE

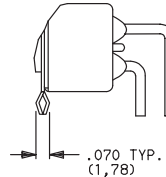
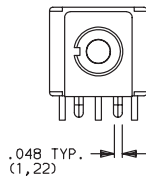


**8221SD9AGE
DPDT**

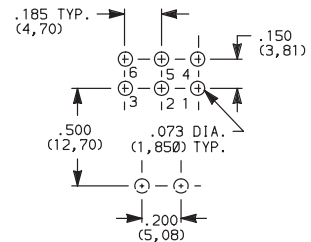


SECTION A-A

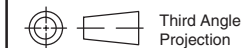
A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



PC MOUNTING



Not available with JXX actuators and I seal option.
Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

8020 Series Snap-acting Momentary Pushbutton Switches

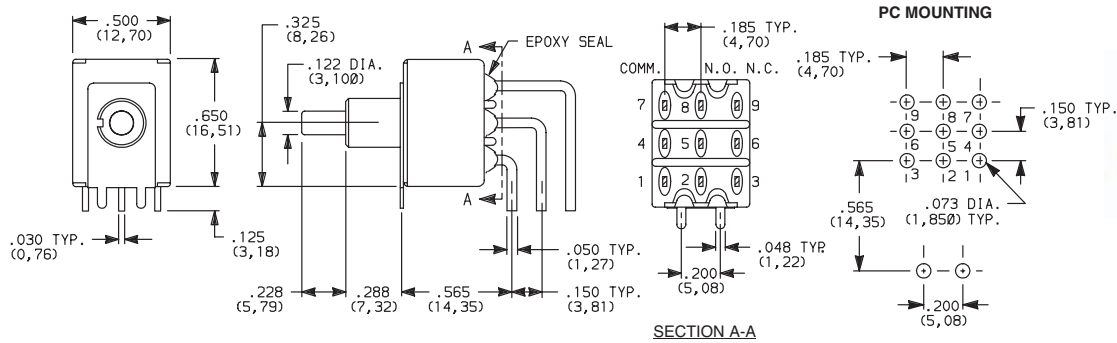


Pushbutton

TERMINATIONS



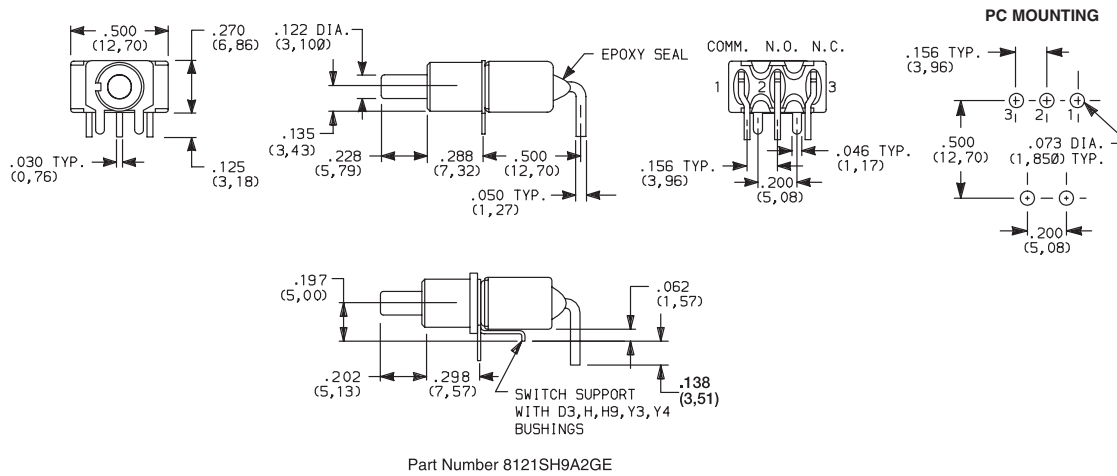
A RIGHT ANGLE, PC THRU-HOLE



8321SD9AGE
3PDT

Not available with JXX actuators and I seal option.
Terminal bend radii and lead-in manufacturing option.

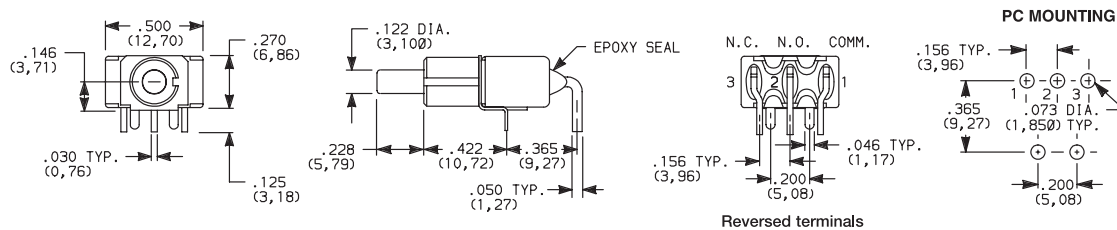
A2 RIGHT ANGLE, PC THRU-HOLE



8121SD9A2GE
SPDT

Not available with JXX actuators, I seal option.
Terminal bend radii and lead-in manufacturing option.

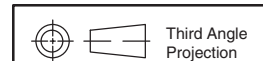
A4 RIGHT ANGLE, PC THRU-HOLE, REVERSED TERMINALS



8121SD9A4GE
SPDT

Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings and I seal.
Terminal bend radii and lead-in manufacturing option.

The A4 and R2 termination options are functionally identical and fit the same PC mounting pattern. The switches, however, are shifted relative to the mounting holes. The PC pattern must clear the switch support legs. Unlike the R2, the A4 option is available with UL/CSA.



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





8020 Series Snap-acting Momentary Pushbutton Switches

TERMINATIONS



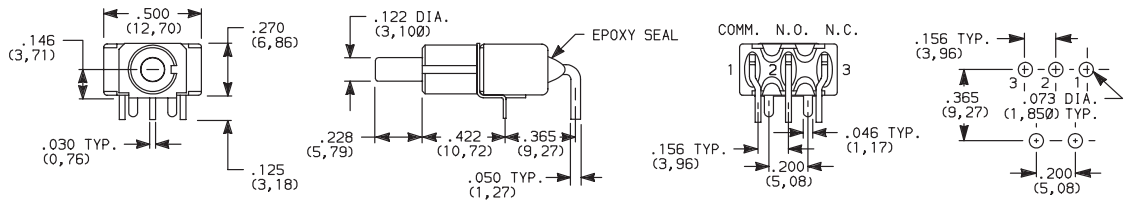
Pushbutton

A

A6 RIGHT ANGLE, PC THRU-HOLE



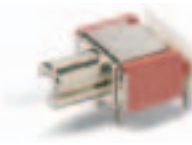
8121SD9A6GE
SPDT



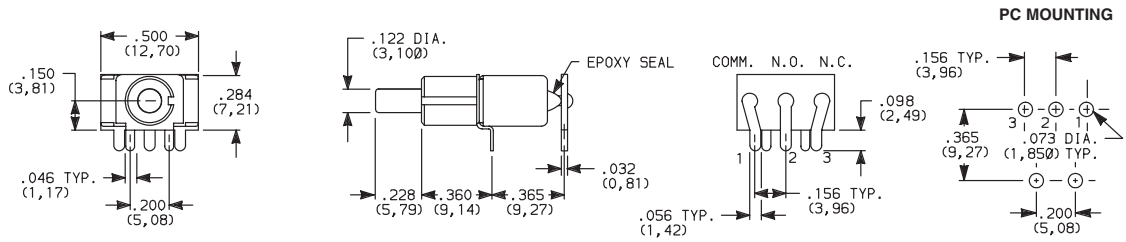
The A6 and R termination options are functionally identical and fit the same PC mounting pattern. The switches, however, are shifted relative to the mounting holes. The PC pattern must clear the switch support legs. Unlike the R, the A6 option is available with UL/CSA.

Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings and I seal. Terminal bend radii and lead-in manufacturing option.

R RIGHT ANGLE WITH PCB



8121SD9RGE
SPDT

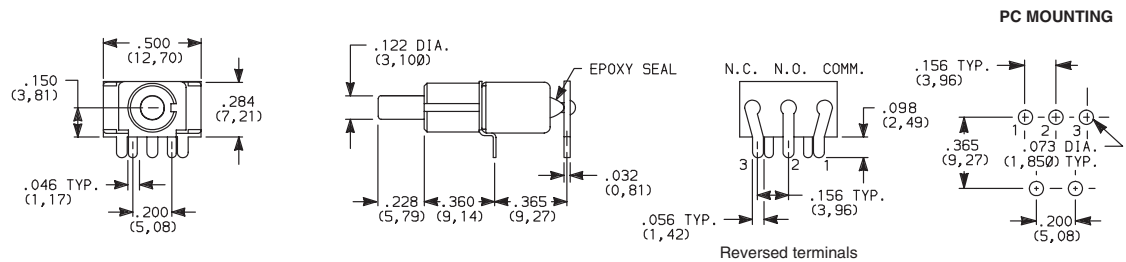


Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option. R termination not UL/CSA approved.

R2 RIGHT ANGLE WITH PCB, REVERSED TERMINALS



8121SD9R2GE
SPDT

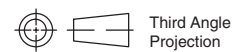
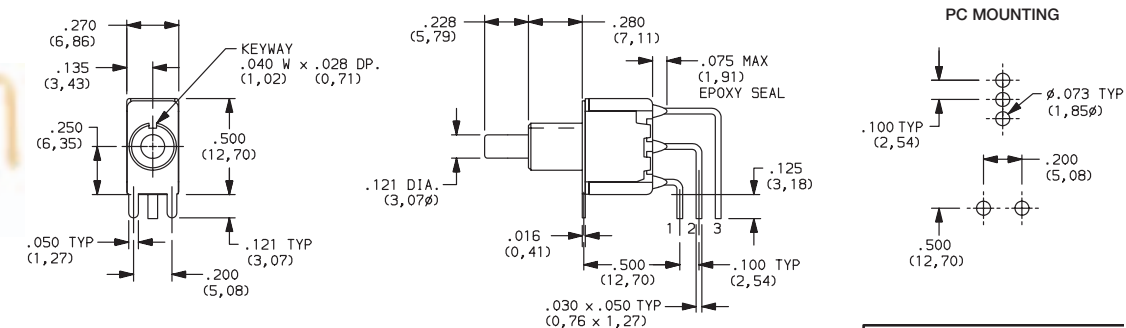


Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option. R2 termination not UL/CSA approved.

AV VERTICAL RIGHT ANGLE, PC THRU-HOLE, .100" PITCH



8121SD9AVGE
SPDT



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8020 Series Snap-acting Momentary Pushbutton Switches

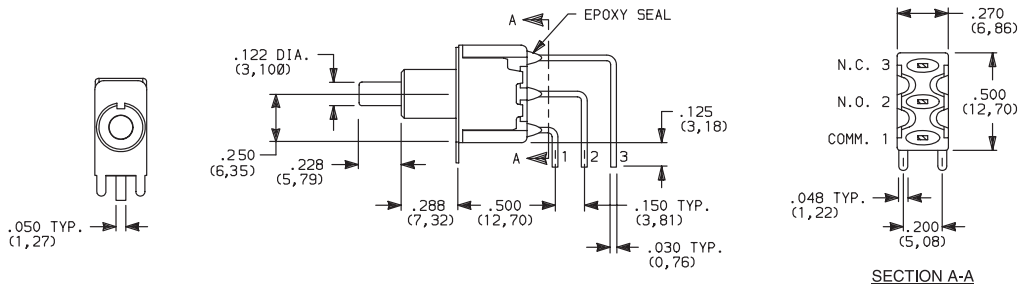


A

Pushbutton

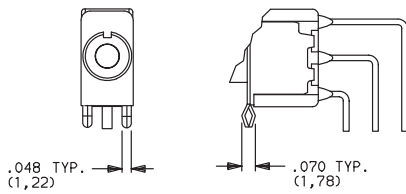
TERMINATIONS

AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH

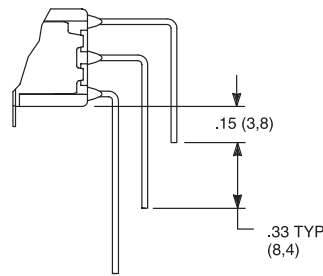


8121SD9AV2GE SPDT

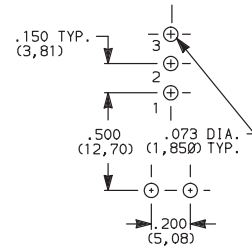
AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



AV1 VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH

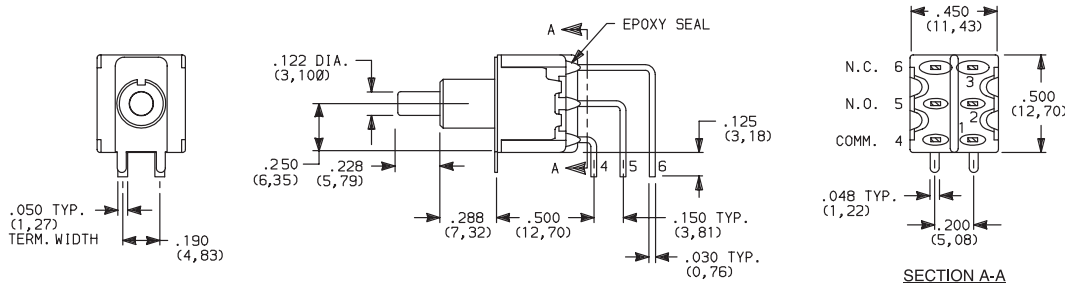


PC MOUNTING



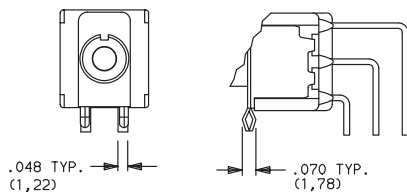
Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH

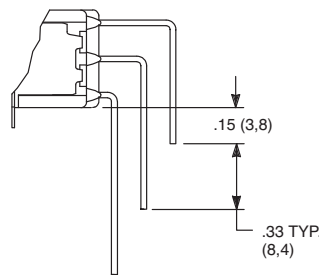


8221SD9AV2GE DPDT

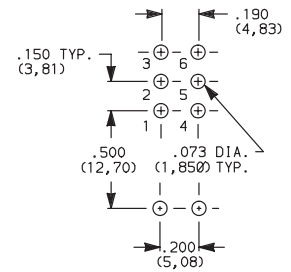
AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



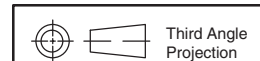
AV1 VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150" PITCH



PC MOUNTING



Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





8020 Series Snap-acting Momentary Pushbutton Switches

TERMINATIONS



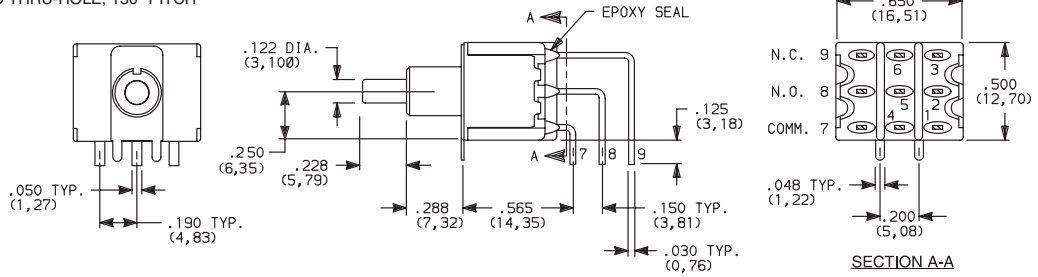
Pushbutton

A

AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, 150° PITCH

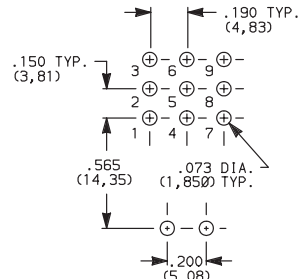


8321SD9AV2GE
3PDT

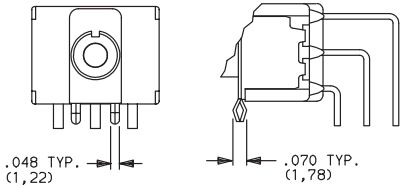


SECTION A-A

PC MOUNTING

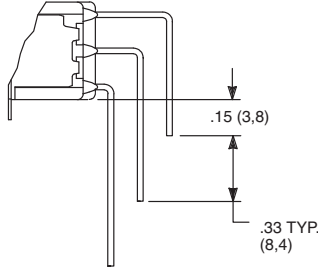


AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150° PITCH



Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

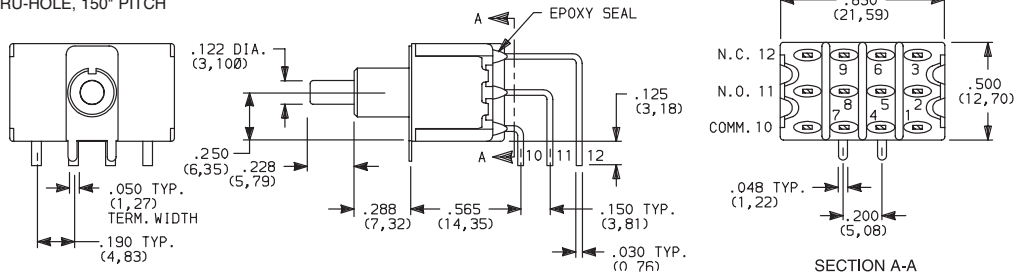
AV1 VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150° PITCH



AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, 150° PITCH

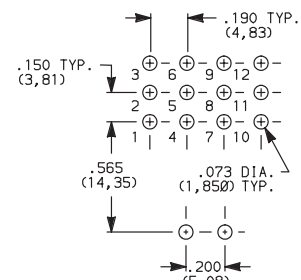


8421SD9AV2GE
4PDT

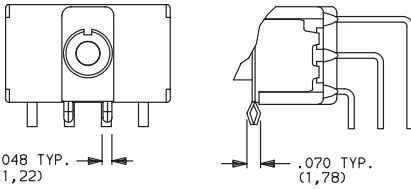


SECTION A-A

PC MOUNTING

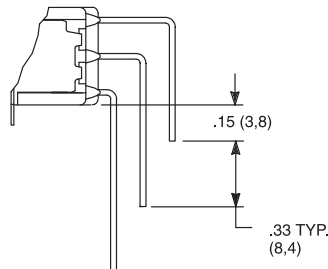


AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150° PITCH



Not available with JXX actuators and I seal.
Terminal bend radii and lead-in manufacturing option.

AV1 VERTICAL RIGHT ANGLE, EXTENDED, PC THRU-HOLE, .150° PITCH



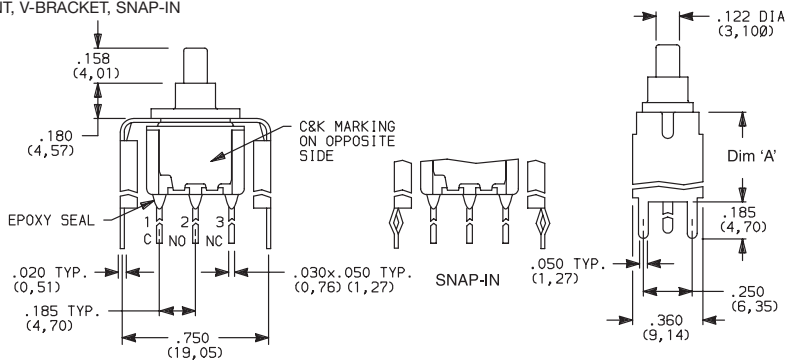
V2, V6, V7, V8

VERTICAL MOUNT, V-BRACKET

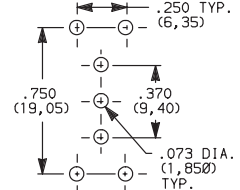
V61 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8121SD3_GE
SPDT



PC MOUNTING



OPTION CODE	DIM 'A'
V2	.555 (14,10)
V6, V61	.460 (11,68)
V7	.630 (16,00)
V8	.953 (24,21)

Not available with JXX actuators and I seal.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8020 Series Snap-acting Momentary Pushbutton Switches



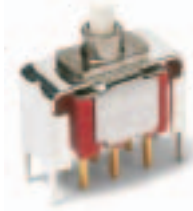
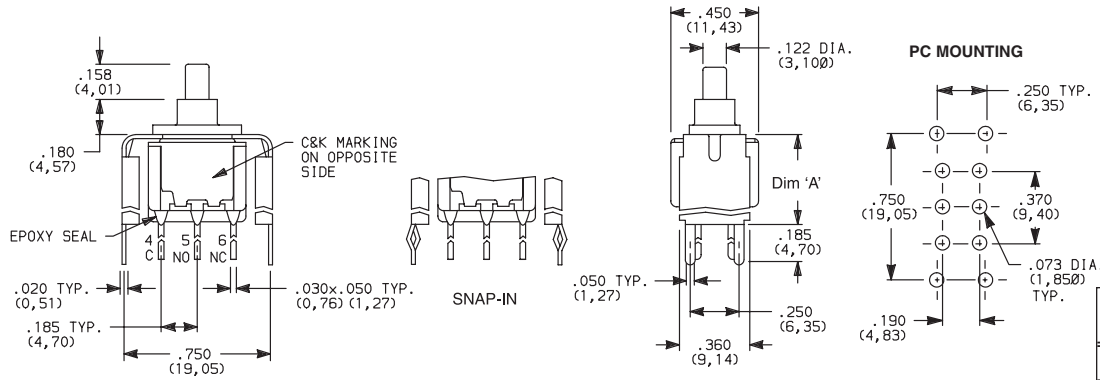
A

Pushbutton

TERMINATIONS

V2, V6, V7, V8 VERTICAL MOUNT, V-BRACKET

V61 VERTICAL MOUNT, V-BRACKET, SNAP-IN

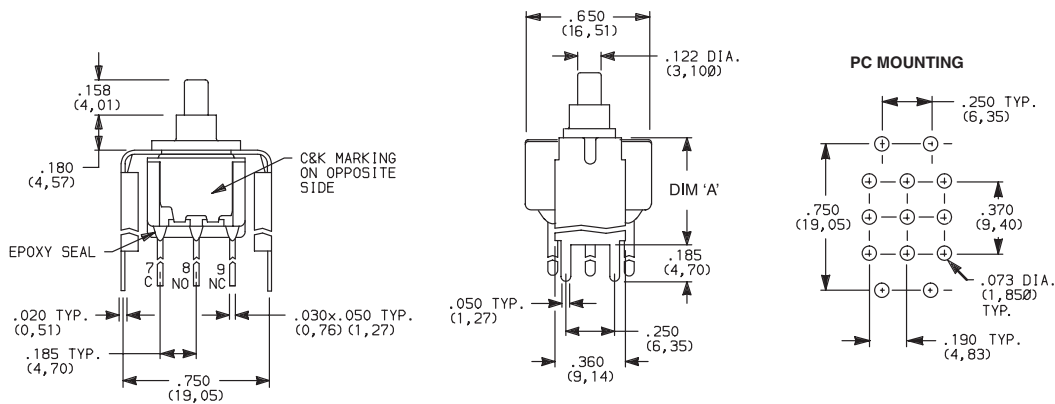


8221SD3_GE DPDT

OPTION CODE	DIM 'A'
V2	.555 (14,10)
V6, V61	.460 (11,68)
V7	.630 (16,00)
V8	.953 (24,21)

Not available with JXX actuators and I seal.

V2, V7, V8 VERTICAL MOUNT, V-BRACKET

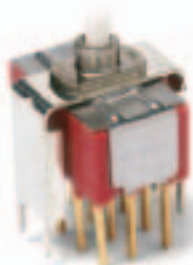
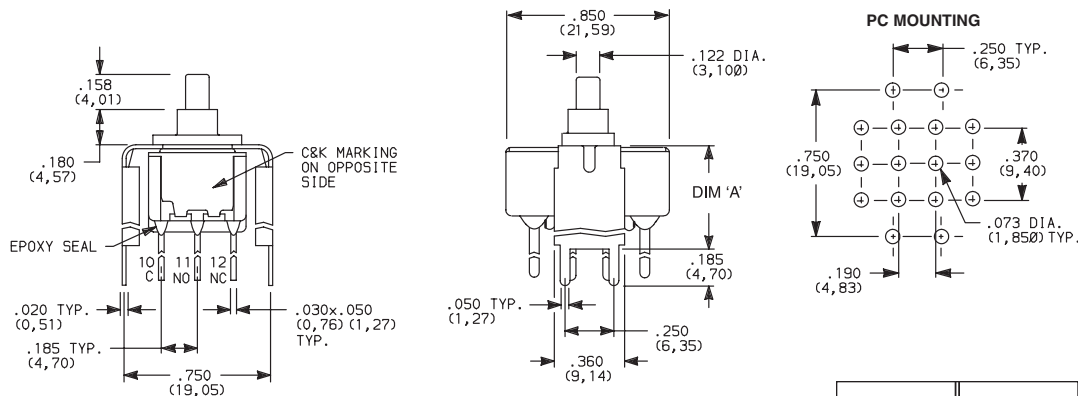


8321SD3_GE 3PDT

OPTION CODE	DIM 'A'
V2	.555 (14,10)
V7	.630 (16,00)
V8	.953 (24,21)

Not available with JXX actuators and I seal.

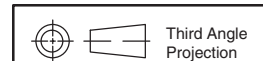
V2, V7, V8 VERTICAL MOUNT, V-BRACKET



8421SD3_GE 4PDT

OPTION CODE	DIM 'A'
V2	.555 (14,10)
V7	.630 (16,00)
V8	.953 (24,21)

Not available with JXX actuators and I seal.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





8020 Series Snap-acting Momentary Pushbutton Switches

TERMINATIONS



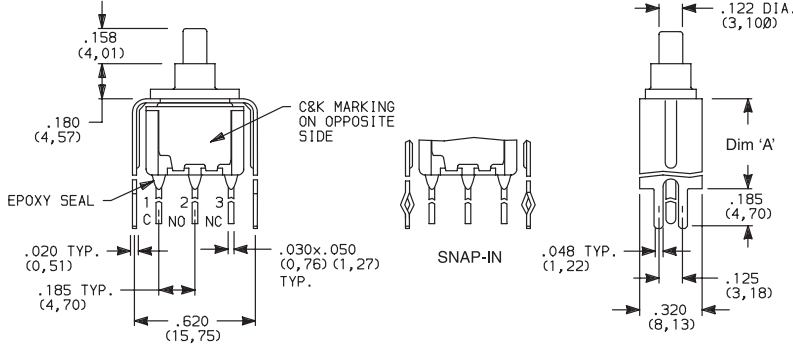
Pushbutton
A

V3, V4, V9 VERTICAL MOUNT, V-BRACKET

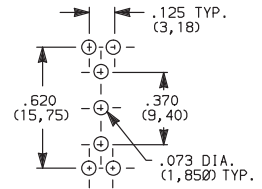
V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8121SD3_GE
SPDT



PC MOUNTING



OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4	.630 (16,00)
V9	1.150 (29,21)

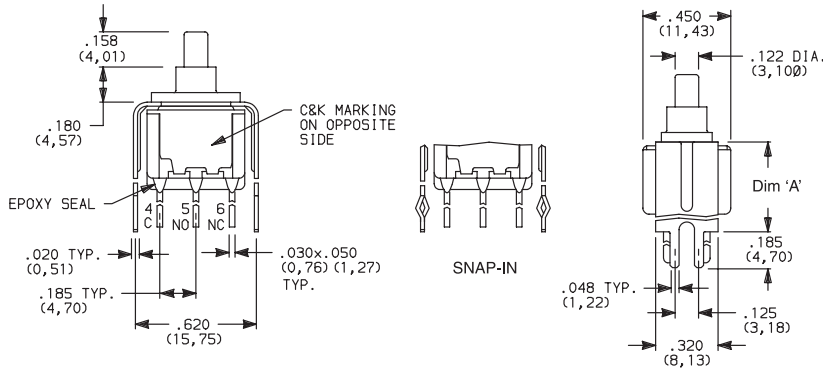
Not available with J8X actuators and I seal.

V3, V4, V9 VERTICAL MOUNT, V-BRACKET

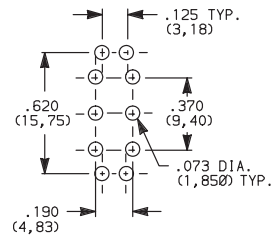
V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



8221SD3_GE
DPDT



PC MOUNTING



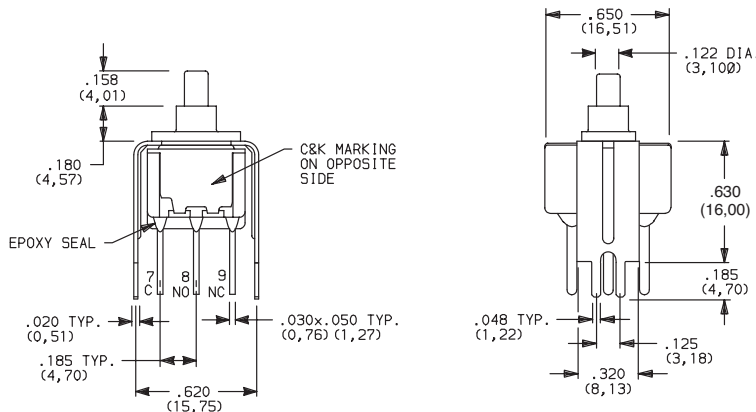
OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4	.630 (16,00)
V9	1.150 (29,21)

Not available with J8X actuators and I seal.

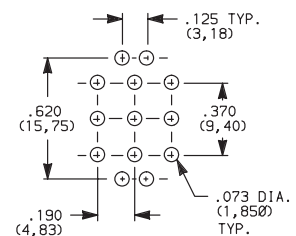
V4, V9 VERTICAL MOUNT, V-BRACKET



8321SD3V4GE
3PDT



PC MOUNTING



OPTION CODE	DIM 'A'
V4	.630 (16,00)
V9	1.150 (29,21)

Not available with JXX actuators and I seal.



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

8020 Series Snap-acting Momentary Pushbutton Switches



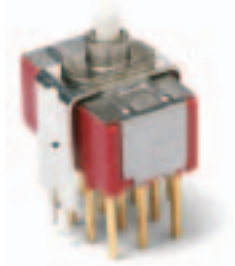
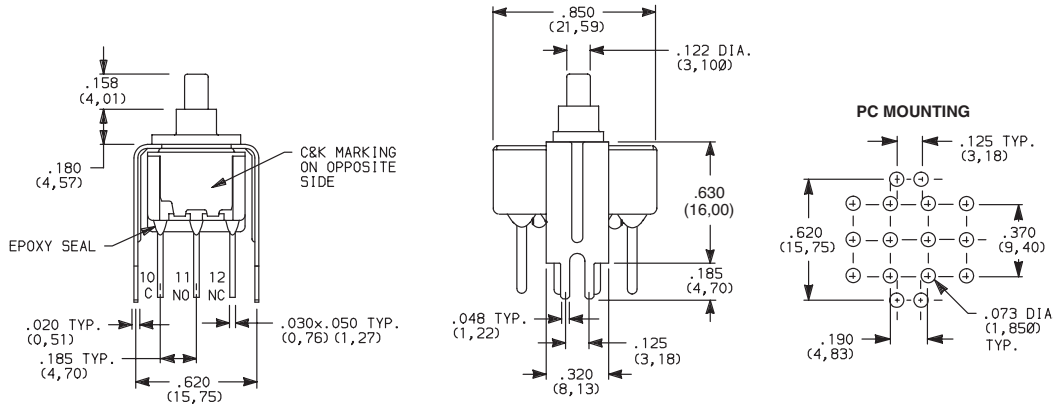
A

Pushbutton

TERMINATIONS



V4, V9 VERTICAL MOUNT, V-BRACKET



8421SD3V4GE 4PDT

OPTION CODE	DIM 'A'
V4	.630 (16,00)
V9	1.150 (29,21)

Not available with JXX actuators and I seal.

CONTACT MATERIAL



OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL/DRY CIRCUIT	8x25 MODELS ONLY: 0.4 MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN ⁴		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	8X21, U8X1 MODELS ONLY: 0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
R		MATTE-TIN ⁴		

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- ¹ ALL CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- ⁴ TERMINALS: Copper alloy, with matte-tin over nickel plate.

NOTE: Any models supplied with B, P, R or G contact material are RoHS compliant.

U811-U841 models with all options (except R, R2 terminations) when ordered with mandatory G, R or L contact material.

B or P contact material must be ordered with 8X25 models.

G or R contact material must be ordered with 8X21, U8X1 models.

P or R contact material not available with Z, Z3 terminations.

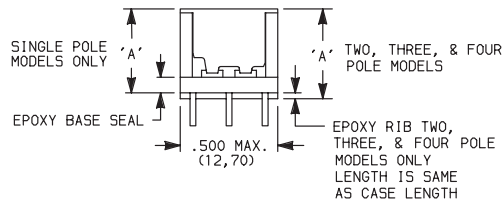
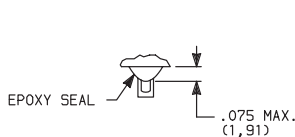
K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

SEAL



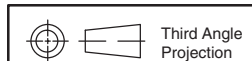
E EPOXY SEAL

I EPOXY POTTED BASE



NO. POLES	DIM 'A'
SP	.410 (10,41)
DP	.440 (11,18)
3P	.505 (12,83)
4P	.505 (12,83)

NOTE: Available with C, W-W4, Z, Z3 terminations only.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



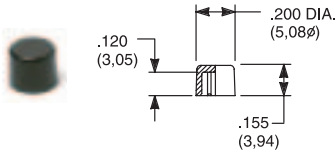


8020 Series Snap-acting Momentary Pushbutton Switches

AVAILABLE HARDWARE

Pushbutton
A

Cap

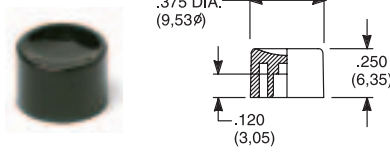


PART NO.

- 708901000** WHITE
- 708902000** BLACK
- 708903000** RED
- 708904000** ORANGE
- 708905000** YELLOW
- 708906000** GREEN
- 708907000** BLUE
- 708909000** GRAY

Material: Nylon
Finish: Gloss

Cap

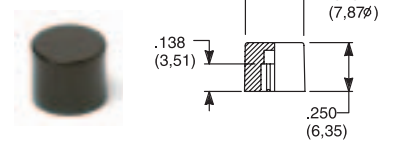


PART NO.

- 752701000** WHITE
- 752702000** BLACK
- 752703000** RED
- 752704000** ORANGE
- 752705000** YELLOW
- 752706000** GREEN
- 752707000** BLUE
- 752709000** GRAY

Material: Nylon
Finish: Gloss

Cap

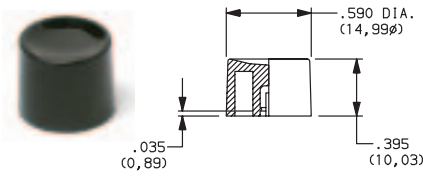


PART NO.

- 801801000** WHITE
- 801802000** BLACK
- 801803000** RED
- 801804000** ORANGE
- 801805000** YELLOW
- 801806000** GREEN
- 801807000** BLUE
- 801809000** GRAY

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

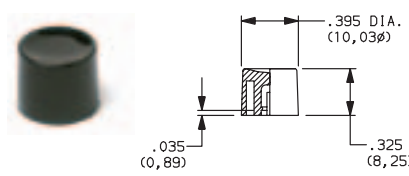


PART NO.

- 894001000** WHITE
- 894002000** BLACK
- 894003000** RED
- 894004000** ORANGE
- 894005000** YELLOW
- 894006000** GREEN
- 894007000** BLUE
- 894009000** GRAY

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

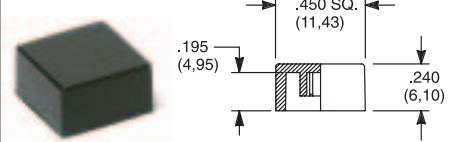


PART NO.

- 894101000** WHITE
- 894102000** BLACK
- 894103000** RED
- 894104000** ORANGE
- 894105000** YELLOW
- 894106000** GREEN
- 894107000** BLUE
- 894109000** GRAY

Material: Nylon
Finish: Gloss

Cap, J80, J81, J82, J83 & J84 options only



PART NO.

- 484601000** WHITE
- 484602000** BLACK
- 484603000** RED
- 484604000** ORANGE
- 484605000** YELLOW
- 484606000** GREEN
- 484607000** BLUE
- 484609000** GRAY

Material: Nylon
Finish: Gloss

PART NO.

- 798201000** WHITE
- 798202263** BLACK
- 798203000** RED
- 798204000** ORANGE
- 798205000** YELLOW
- 798206000** GREEN
- 798207000** BLUE
- 798209000** GRAY

Material: Nylon
Finish: Matte

Frame



PART NO.

- 615601000** WHITE
- 615602263** BLACK
- 615603000** RED
- 615605000** YELLOW
- 615606000** GREEN
- 615609000** GRAY

Material: Nylon
Finish: Matte

Frame

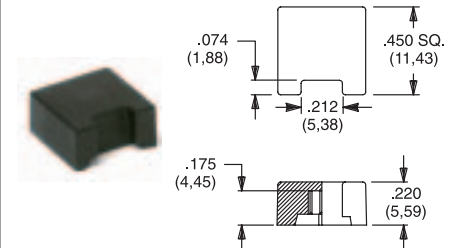


PART NO.

- 613301000** WHITE
- 613302263** BLACK
- 613303000** RED
- 613305000** YELLOW
- 613306000** GREEN
- 613309000** GRAY

Material: Nylon
Finish: Matte

Cap, J85 & J95 options only



PART NO.

- 459701000** WHITE
- 459702000** BLACK
- 459703000** RED
- 459704000** ORANGE
- 459705000** YELLOW
- 459706000** GREEN
- 459707000** BLUE
- 459709000** GRAY

Material: Nylon
Finish: Gloss

PART NO.

- 476801000** WHITE
- 476802000** BLACK
- 476803000** RED
- 476804000** ORANGE
- 476805000** YELLOW
- 476806000** GREEN
- 476807000** BLUE
- 476809000** GRAY

Material: Nylon
Finish: Matte

Fits Z3 Termination female connector



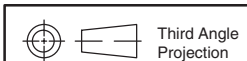
PART NO.

- 530100000**

Available in loose pieces.

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".

Other cap & frame colors available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



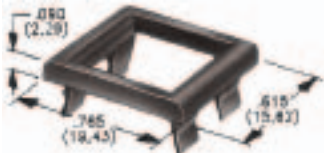
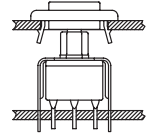
8020 Series Snap-acting Momentary Pushbutton Switches



AVAILABLE HARDWARE

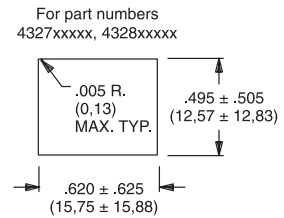
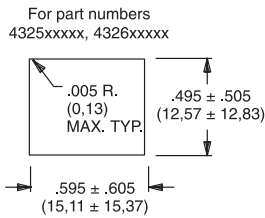
Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

TYPICAL APPLICATION



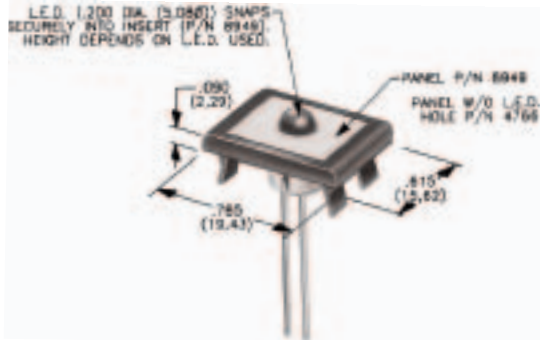
.047" (1,19) PANEL THK.	.062" (1,57) PANEL THK.	.090" (2,29) PANEL THK.	.125" (3,18) PANEL THK.
PART NO.	PART NO.	PART NO.	PART NO.
432501000	432601000	432701000	432801000
432502263	432602263	432702263	432802263
432503000	432603000	432703000	432803000
432505000	432605000	432705000	432805000
432506000	432606000	432706000	432806000
432509000	432609000	432709000	432809000
			WHITE
			BLACK
			RED
			YELLOW
			GREEN
			GRAY

PANEL MOUNTING



Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. **LED not included.**



PANEL INSERT WITH HOLE FOR LED

BLANK PANEL INSERT WITHOUT HOLE FOR LED

PART NO.

894901000
894902000
894903000
894905000
894906000
894909000

PART NO.

476601000
476602000
476603000
476605000
476606000
476609000

WHITE
BLACK
RED
YELLOW
GREEN
GRAY

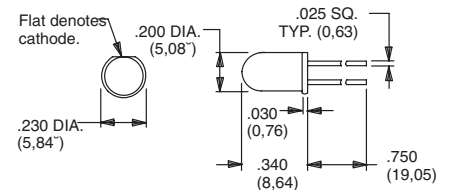
Special colors, custom markings available, consult Customer Service Center.

LED INFORMATION

SWITCHES WITH LED SUPPLIED: J85, J95 OPTIONS:

Rectangular LEDs are supplied on 8020 Series pushbutton switches with J85 and J95 options. These LEDs are factory installed and are not replaceable. The following specifications apply:

OPTION CODE	COLOR	TYP. INTENSITY	TYP. FORWARD VOLTAGE	TYP. FORWARD CURRENT	MAX RATINGS AT 25°C AMBIENT TEMPERATURE		
					FORWARD VOLTAGE	CONTINUOUS FORWARD CURRENT	POWER DISSIPATION
6	Green	1.0 mcd	2.1 V	20 mA	2.5 V	50 mA	125 mW
3	Red*	0.5 mcd		10 mA		30 mA	75 mW
5	Yellow	4.0 mcd		20 mA		50 mA	125 mW

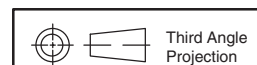


Suggested LED for J82 & J84 options. Dimensions for reference only.

Process Information: Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

Caution: Circuit elements must limit forward current of LED to 50mA max. continuous.

* Extra-bright red LED available (typ. intensity 4.5 mcd), consult Customer Service Center. LEDs are not supplied with J82, J84 options. LED snaps into switch frame surrounding actuator and is wired externally.

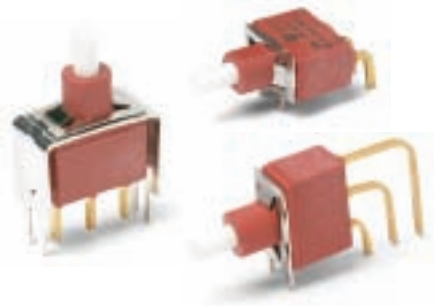


Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





E010 Series Sealed Momentary Pushbutton Switches



Features/Benefits

- *Process sealed, withstands soldering and cleaning*
- *Long life contact design*
- *Snap-fitting plunger available, accepts a variety of caps*
- *RoHS compliant models available*

Typical Applications

- *Instrumentation*
- *Telecommunications and networking equipment*
- *Computers and peripherals*



Specifications

CONTACT RATING: Q contact material: 4 AMPS @ 125 V AC or 28 V DC. See page A-50 for additional ratings.
 ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.
 CONTACT RESISTANCE: Below 20 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
 INSULATION RESISTANCE: 10⁹Ω min.
 DIELECTRIC STRENGTH: 1000 Vrms min. @ sea level.
 OPERATING TEMPERATURE: -30°C to 75°C.
 CAP INSTALLATION FORCE: 10 lbs. max. permissible.
 SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

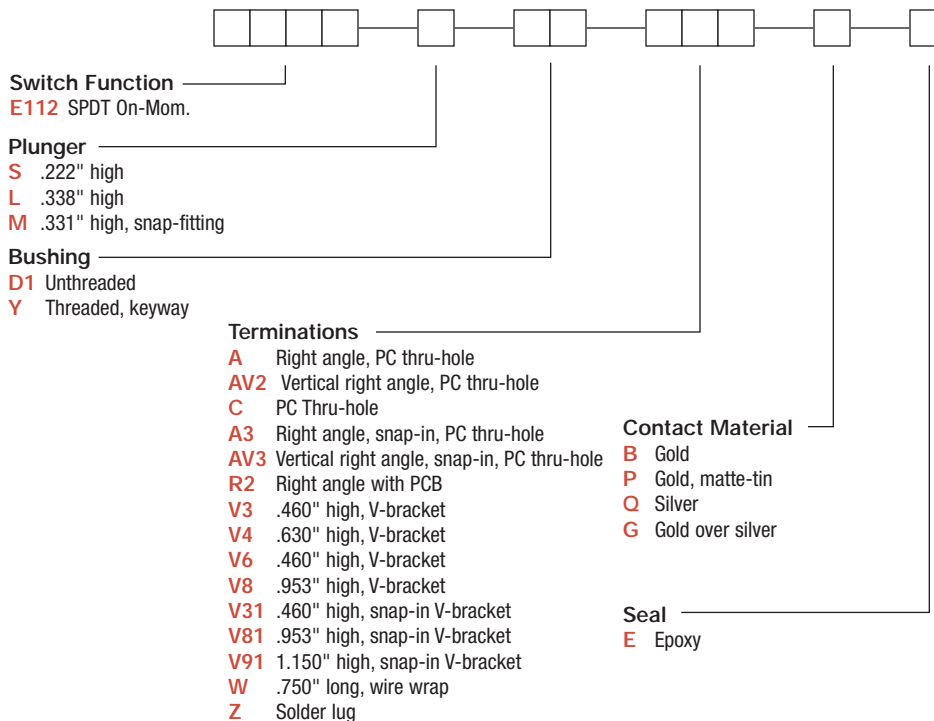
NOTE: Any models supplied with P, Q, B or G contact material are RoHS compliant.
NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE & BUSHING: Glass filled nylon 6/6, flame retardant (UL 94V-0).
 PLUNGER: Glass filled nylon or glass filled polyester (PBT) (UL 94V-0), with internal o-ring seal standard.
 SWITCH SUPPORT: Brass or steel, matte-tin plated.
 SWITCH SUPPORT RETAINER: Stainless steel.
 END CONTACTS: Q contact material: Coin silver, silver plated. See A-50 for additional ratings.
 CENTER CONTACTS & ALL TERMINALS: Q contact material: Copper alloy, silver plated. See page A-50 for additional ratings.
 TERMINAL SEAL: Epoxy.
 HARDWARE: Nut & locking ring-Brass, nickel plated. Lockwasher-Steel, nickel plated.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-47 thru A-51. For additional options not shown in catalog, consult Customer Service Center. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



Dimensions are shown: Inches (mm)
 Specifications and dimensions subject to change

E010 Series Sealed Momentary Pushbutton Switches



A

Pushbutton

SWITCH FUNCTION

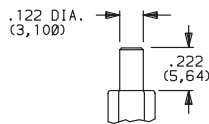
NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
		C&K marking this side		C&K marking this side		
SP	E112	ON	MOM.	2-1	2-3	<p>SPDT NC 1 2 (COMM) 3 NO</p>
<p>SPDT</p> <p>Part number shown: E112SD1CQE</p>						

MOM. = Momentary

All models with all options when ordered with G or Q contact material.

PLUNGER

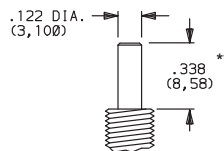
S .218" HIGH



Standard with D1 bushing (as shown).

† Subtract .100 (2,54) from plunger length when ordered with Y bushing.

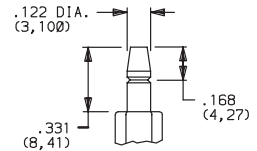
L .338" HIGH



Standard with Y bushing (as shown).

** Add .100 (2,54) from plunger length when ordered with D1 bushing.

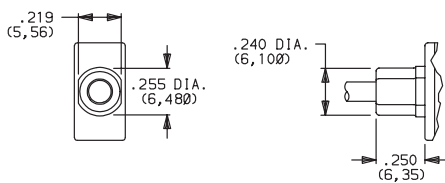
M .331" HIGH, SNAP-FITTING



NOTE: Caps available for all plunger options, see pages A-50 and A-51.

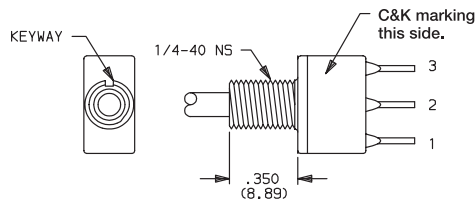
BUSHING

D1 UNTHREADED



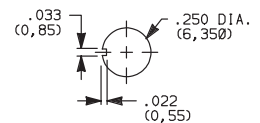
S plunger standard with D1 bushing.

Y THREADED, KEYWAY

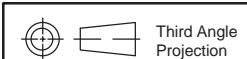


L plunger standard with Y bushing. Available only with C, Z terminations.
Hardware: One dress nut part number 780701201, one hex nut and lockwasher supplied standard.
Withstands 4 in./lbs. without distortion.

PANEL MOUNTING



NOTE: Internal o-ring actuator seal standard for all bushing options.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





E010 Series Sealed Momentary Pushbutton Switches

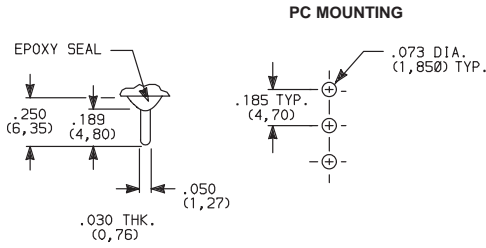
TERMINATIONS



Pushbutton

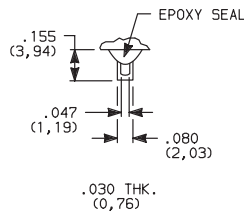
A

C PC THRU-HOLE



SPDT

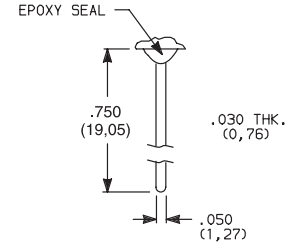
Z SOLDER LUG



SPDT

Not available with P contact materials.

W WIRE WRAP

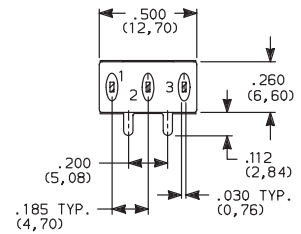
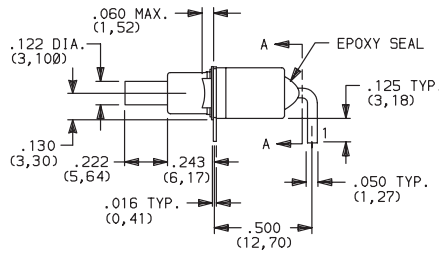
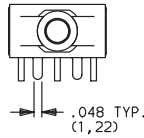


SPDT

A RIGHT ANGLE, PC THRU-HOLE

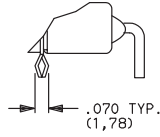
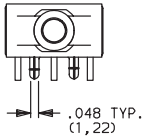


E112SD1ABE
SPDT

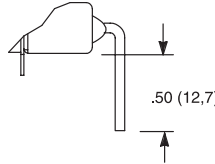


SECTION A-A

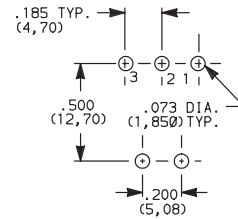
A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE



AW RIGHT ANGLE, EXTENDED, PC THRU-HOLE



PC MOUNTING

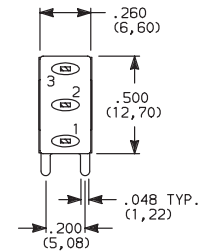
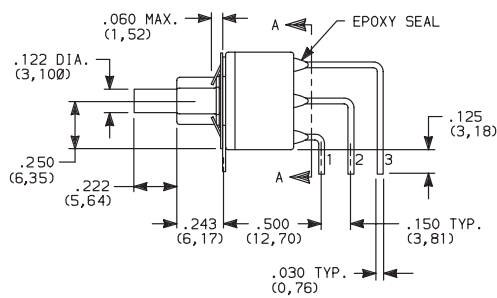
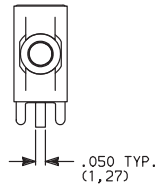


NOTE: Terminal bend radii and lead-in manufacturing option. Available with D1 bushing only.

AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150° PITCH

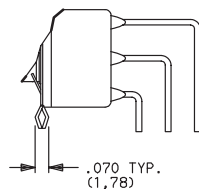
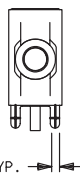


E112SD1AV2BE
SPDT

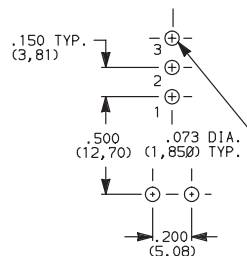


SECTION A-A

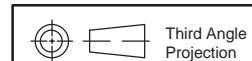
AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150° PITCH



PC MOUNTING



NOTE: Terminal bend radii and lead-in manufacturing option. Available with D1 bushing only.



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



E010 Series Sealed Momentary Pushbutton Switches

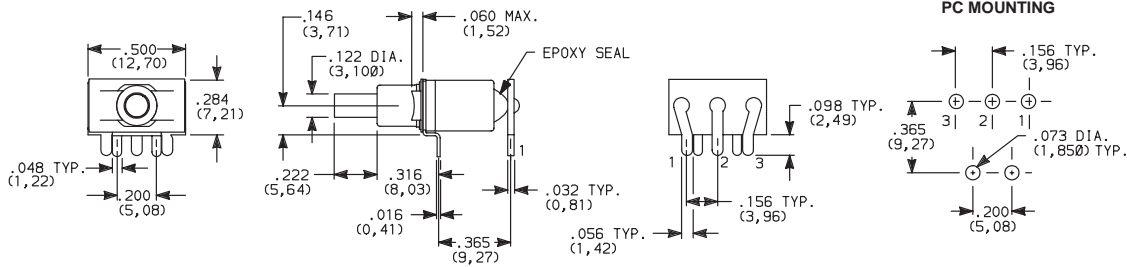


A

Pushbutton

TERMINATIONS

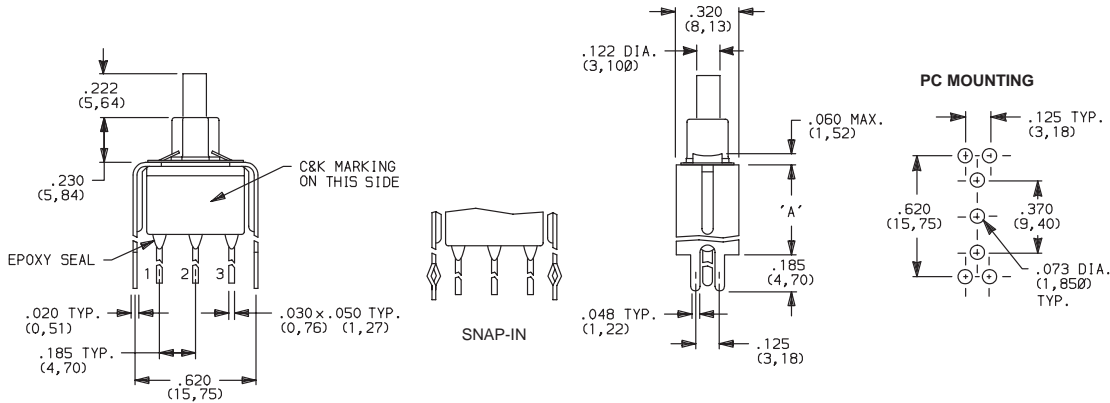
R2 RIGHT ANGLE WITH PCB



NOTE: Available with D1 bushing and B contact material only.

V3, V4 VERTICAL MOUNT, V-BRACKET

V31, V91 VERTICAL MOUNT, V-BRACKET, SNAP-IN

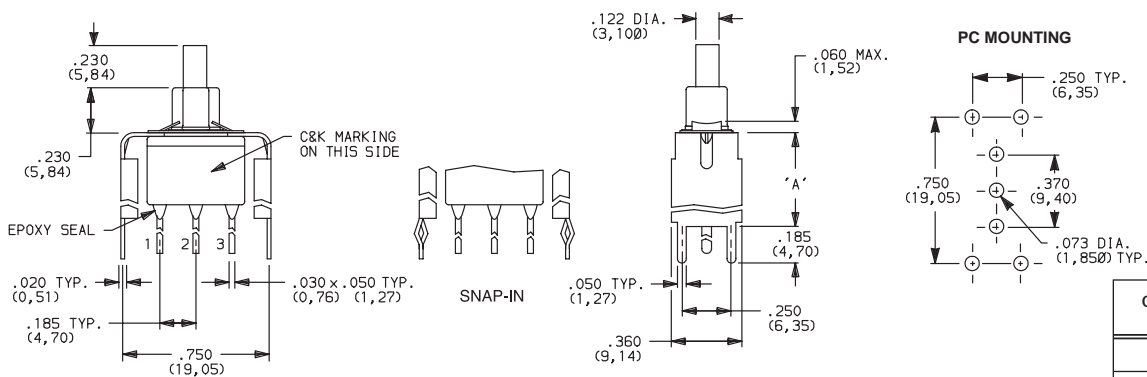


OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4	.630 (16,00)
V91	1.150 (29,21)

NOTE: Available with D1 bushing only.

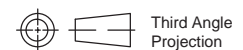
V6, V8 VERTICAL MOUNT, V-BRACKET

V81 VERTICAL MOUNT, V-BRACKET, SNAP-IN



OPTION CODE	DIM 'A'
V6	.460 (11,68)
V8, V81	.953 (24,21)

NOTE: Available with D1 bushing only.



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



E010 Series Sealed Momentary Pushbutton Switches

CONTACT MATERIAL



Pushbutton
A

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	4 AMPS @ 125 V AC OR 28 V DC.
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX. @ 20 V AC OR DC MAX. OR 4 AMPS @ 125 V AC OR 28 V DC.

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- ¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² END CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ CENTER CONTACTS & ALL TERMINALS: Coin silver, with gold plate over nickel plate.
- ⁴ END CONTACTS: Coin silver, silver plated.
- ⁵ CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
- ⁶ TERMINALS: Copper alloy, with matte-tin over nickel plate.

NOTE: Any models supplied with P, Q, B or G contact material are RoHS compliant.

All models with all options when ordered with G or Q contact material.

B contact material standard with all terminations except C, Z.

B contact material must be ordered with R2 terminations.

Q contact material standard with C, Z terminations.

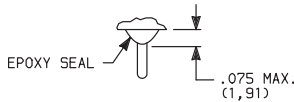
P contact materials not available with Z terminations.

K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

SEAL

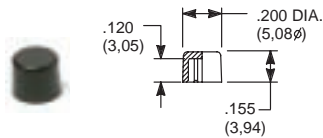


E EPOXY SEAL



AVAILABLE HARDWARE

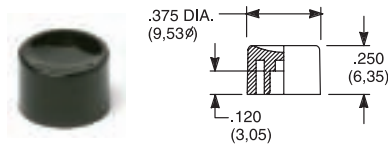
Cap



PART NO.
708901000 WHITE
708902000 BLACK
708903000 RED

Material: Nylon
 Finish: Gloss

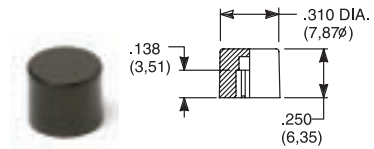
Cap



PART NO.
752701000 WHITE
752702000 BLACK
752703000 RED

Material: Nylon
 Finish: Gloss

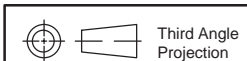
Cap



PART NO.
801801000 WHITE
801802000 BLACK
801803000 RED

Material: Nylon
 Finish: Gloss

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".
 Other cap colors available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
 Specifications and dimensions subject to change

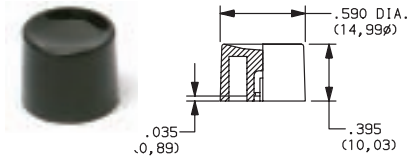


E010 Series Sealed Momentary Pushbutton Switches



AVAILABLE HARDWARE

Cap, Snap-fitting plunger

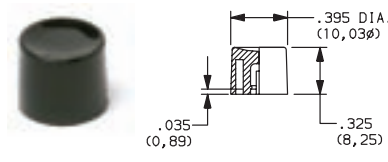


PART NO.

- 894001000 WHITE
- 894002000 BLACK
- 894003000 RED

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

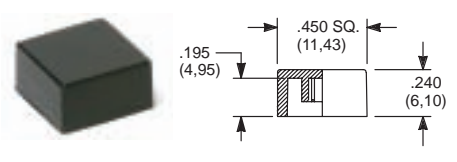


PART NO.

- 894101000 WHITE
- 894102000 BLACK
- 894103000 RED

Material: Nylon
Finish: Gloss

Cap



PART NO.

- 484601000 WHITE
- 484602000 BLACK
- 484603000 RED

Material: Nylon
Finish: Gloss

PART NO.

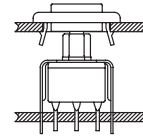
- 798201000 WHITE
- 798202263 BLACK
- 798203000 RED

Material: Nylon
Finish: Matte

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware". Other cap colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

TYPICAL APPLICATION



.047" (1,19) PANEL THK.

.062" (1,57) PANEL THK.

.090" (2,29) PANEL THK.

.125" (3,18) PANEL THK.

PART NO.

- 432501000
- 432502263
- 432503000

PART NO.

- 432601000
- 432602263
- 432603000

PART NO.

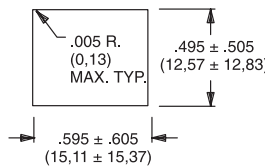
- 432701000
- 432702263
- 432703000

PART NO.

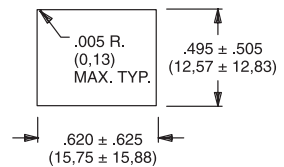
- 432801000 WHITE
- 432802263 BLACK
- 432803000 RED

PANEL MOUNTING

For part numbers
4325xxxxx, 4326xxxxx

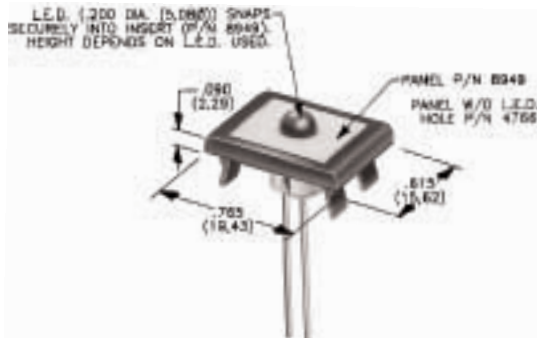


For part numbers
4327xxxxx, 4328xxxxx



Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT
WITH HOLE FOR LED

PART NO.

- 894901000
- 894902000
- 894903000

BLANK PANEL INSERT
WITHOUT HOLE FOR LED

PART NO.

- 476601000 WHITE
- 476602000 BLACK
- 476603000 RED

Special colors, custom markings available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





Pushbutton
A

8060 Series Alternate Action and Momentary Pushbutton Switches



Features/Benefits

- Long travel
- Available with LED
- Long life contact design
- Epoxy terminal seal compatible with bottom wash cleaning
- RoHS compliant models available

Typical Applications

- Instrumentation
- Computers and peripherals
- Telecommunications and networking equipment



Models Available

Specifications

CONTACT RATING: Q contact material: 6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC. See page A-59 for additional ratings.

ELECTRICAL LIFE: 50,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 20 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

CAP INSTALLATION FORCE: 10 lbs. maximum permissible.

NOTE: Any models supplied with P, R, S, Q, B or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE: Glass filled nylon 6/6 or diallyl phthalate (DAP), flame retardant (UL 94V-0).

PLUNGER: S, S1, S2 Options: Glass filled nylon or glass filled polyester (PBT) (UL 94V-0). L, L1 Options: Brass, nickel plated.

CAP & FRAME: Nylon, black standard.

BUSHING: Brass or zinc, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, matte-tin plated.

END CONTACTS: Q contact material: Coin silver, silver plated. See page A-59 for additional contact materials.

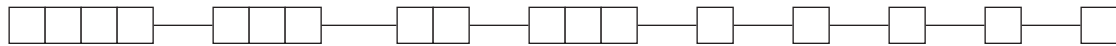
CENTER CONTACT & ALL TERMINALS: Q contact material: Copper alloy, silver plated. See page A-59 for additional contact materials.

TERMINAL SEAL: Epoxy. Refer to soldering and cleaning in Technical Data Chapter.

HARDWARE: Nut & Locking Ring: Brass, nickel plated; Lockwasher: Steel, nickel plated.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-53 thru A-61. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



Switch Function

- 8161** SPDT On-On
- 8168** SPDT On-Mom.
- 8261** DPDT On-On

Actuator or Plunger

- S** .710" high plunger with .375" dia. cap
- J80** Snap-in
- J81** Snap-in with frame
- J82** Snap-in with frame for LED
- J86** Snap-in with frame & LED
- L** .740" high plunger with .395" dia. cap
- L1** .740" high plunger with .590" dia. cap
- S1** .615" high plunger with .200" dia. cap
- S2** .710" high plunger with .310" dia. cap

Bushing

- H** .300" high, flat, hi torque
- H9** .300" high, flat, hi torque
- NONE** No bushing choice required
- Y3** 7.6mm, keyway

Terminations

- A** Right angle, PC thru-hole
- AV2** Vertical right angle, PC thru-hole
- C** PC Thru-hole
- Z** Solder lug
- A3** Right angle, snap-in, PC thru-hole
- AV3** Vertical right angle, snap-in, PC thru-hole
- V3** .460" high, V-bracket
- V4** .630" high, V-bracket
- V6** .460" high, V-bracket
- V21** .555" high, snap-in V-bracket
- V31** .460" high, snap-in V-bracket
- W** .750" long, wire wrap
- Z3** Quick connect

Contact Material

- B** Gold
- P** Gold, matte-tin
- Q** Silver
- S** Silver, matte-tin
- G** Gold over silver
- R** Gold over silver, matte-tin

Seal

- E** Epoxy
- I** Epoxy potted base

Cap Color

- 2** Black
- 1** White
- 3** Red
- 4** Orange
- 5** Yellow
- 9** Gray

Frame Color

- 2** Black

LED Color

- 3** Red
- NONE** Models without LED



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

8060 Series Alternate Action and Momentary Pushbutton Switches



A

Pushbutton

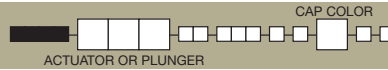
SWITCH FUNCTION

NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	8161 8168	ON	ON	2-3	2-1	SPDT
		ON	MOM.	2-3	2-1	SPDT
<p>SPDT</p> <p>Part number shown: 8161SHZQE</p>						
DP	8261	ON	ON	2-3-5-6	2-1-5-4	DPDT
<p>DPDT</p> <p>Part number shown: 8261SHZQE</p>						

MOM. = Momentary

All models with all options when ordered with G, L, M or Q contact material.

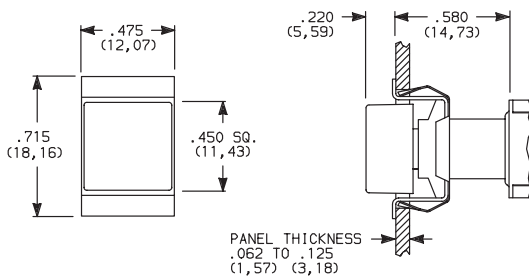
ACTUATOR—SNAP-IN FRONT MOUNT



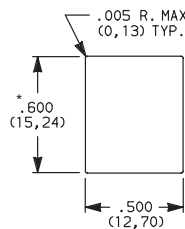
OPTION CODE	CAP COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
9	GRAY

Cap Finish: matte.
Other colors available, consult Customer Service Center.
Available with C, W, Z or Z3 terminations.
NOTE: Caps & frames available separately, see pages A-60 and A-61.

J80 SNAP-IN



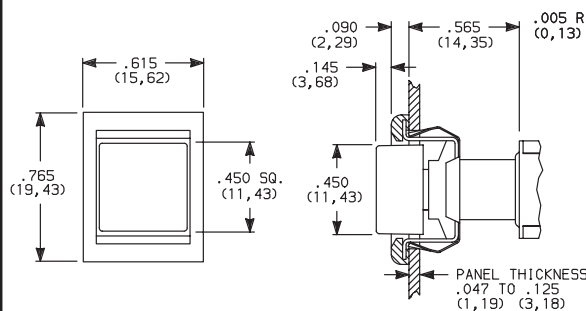
PANEL MOUNTING



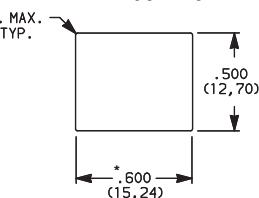
*Increase this dimension to .620/.625 (15.75/15.88) for .091/.125 (2.41/2.18) thick panels.



J81 SNAP-IN WITH BLACK FRAME



PANEL MOUNTING



*Increase this dimension to .620/.625 (15.75/15.88) for .091/.125 (2.41/2.18) thick panels.



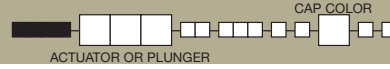
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





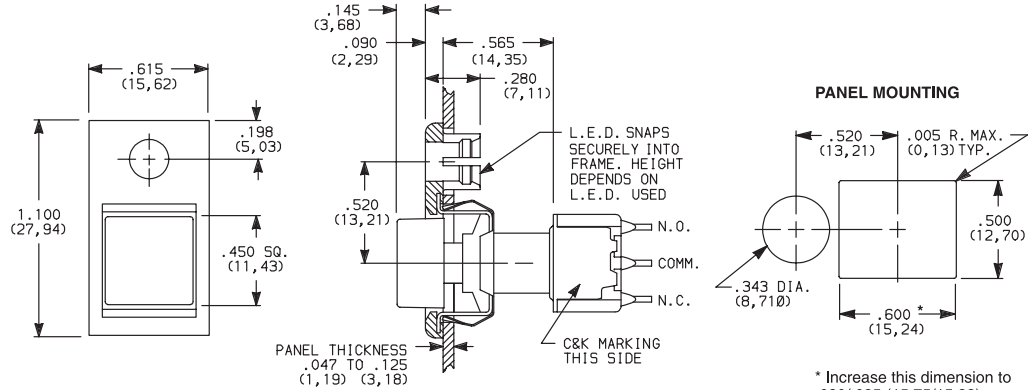
8060 Series Alternate Action and Momentary Pushbutton Switches

ACTUATOR—SNAP-IN FRONT MOUNT



Pushbutton
A

J82 SNAP-IN WITH BLACK FRAME FOR LED



Available with C, W, Z or Z3 terminations.

LED not included.
For LED information, see page A-61.

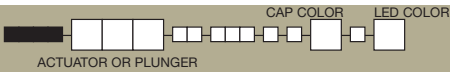
NOTE: Caps & frames available separately, see pages A-60 and A-61.

Other colors available, consult Customer Service Center.

OPTION CODE	CAP COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
9	GRAY

* Increase this dimension to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thick panels.

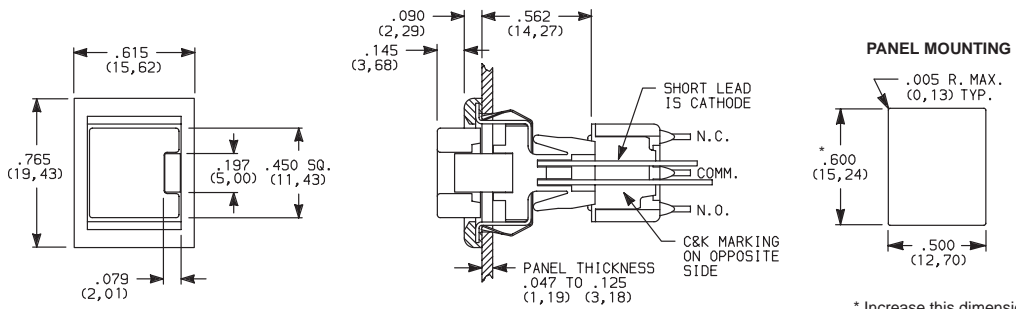
ACTUATOR—SNAP-IN FRONT MOUNT



J86 SNAP-IN WITH BLACK FRAME AND LED



8161J86ZQE223
SPDT



Available with C, W, Z or Z3 terminations and SPDT models only.

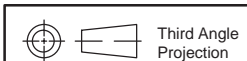
NOTE: Caps & frames available separately, see pages A-60 and A-61.

Other colors available, consult Customer Service Center.

OPTION CODE	CAP COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
9	GRAY

OPTION CODE	LED COLOR
3	RED

For LED information, see page A-59.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



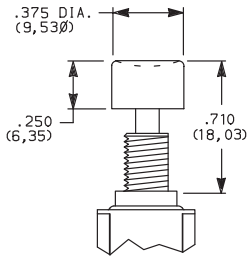
8060 Series Alternate Action and Momentary Pushbutton Switches



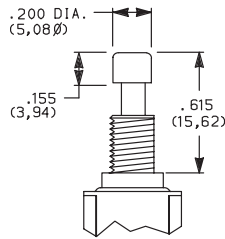
Pushbutton

PLUNGER

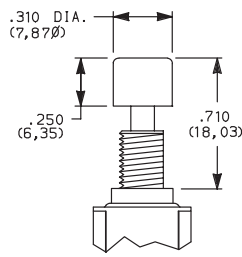
S PLUNGER WITH CAP P/N 7527



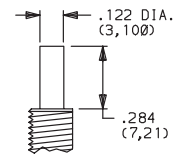
S1 PLUNGER WITH CAP P/N 7089



S2 PLUNGER WITH CAP P/N 8018

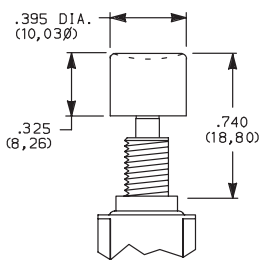


S, S1, S2 plunger dimensions.

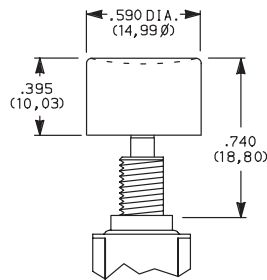


Plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

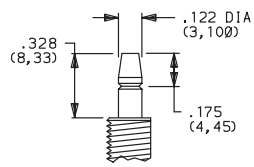
L PLUNGER WITH CAP P/N 8941



L1 PLUNGER WITH CAP P/N 8940



L, L1 plunger dimensions.



Plunger Material: Brass, chrome plated.

OPTION CODE	CAP COLOR
2	BLACK
1	WHITE
3	RED
4	ORANGE
5	YELLOW
9	GRAY

Cap Finish: gloss. Cap supplied not installed. Other colors available, consult Customer Service Center.

NOTE: When selecting plunger and cap option, bushing selection must also be made, see below.

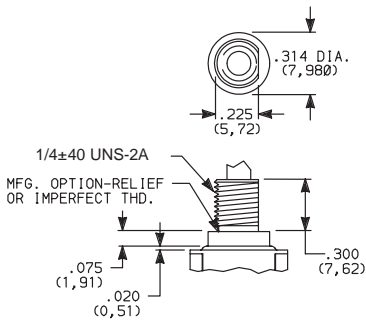
BUSHING

H .300" HIGH THREADED, FLAT

NONE NO BUSHING CHOICE REQUIRED (JXX ACTUATORS)

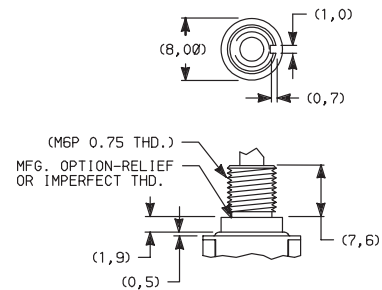
Y3 7.6mm THREADED, KEYWAY

H9 .300" HIGH UNTHREADED, FLAT



H bushing standard with C, W, Z or Z3 terminations. H9 bushing standard with A, A3, AV2, AV3, or V3-V31 terminations.

Withstands 12 in./lbs. of torque with no distortion.

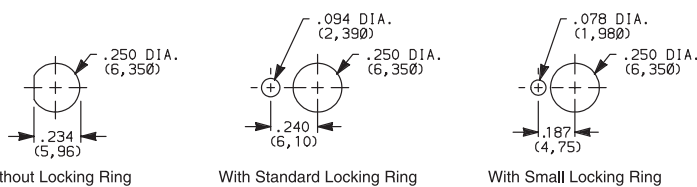


Withstands 12 in./lbs. of torque with no distortion.

NOTE: When selecting bushing option, plunger selection must also be made, see above. No bushing option choice required when any JXX actuator option is selected.

PANEL MOUNTING

1/4 IN. BUSHING

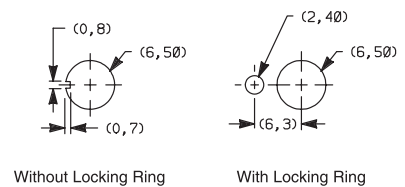


Without Locking Ring

With Standard Locking Ring

With Small Locking Ring

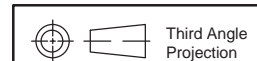
METRIC BUSHING



Without Locking Ring

With Locking Ring

NOTE. Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see section "Technical Data and Additional Hardware".



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

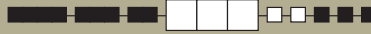




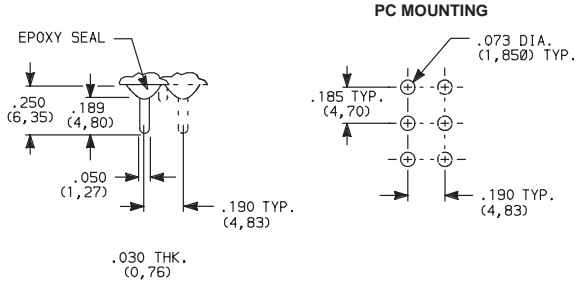
Pushbutton
A

8060 Series Alternate Action and Momentary Pushbutton Switches

TERMINATIONS

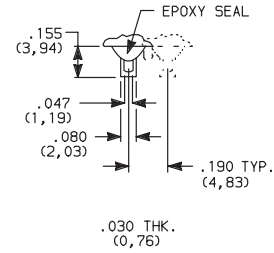


C PC THRU-HOLE



SPDT and DPDT

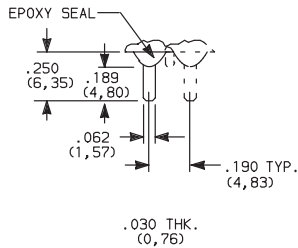
Z SOLDER LUG



SPDT and DPDT

Not available with P, S or R contact material.

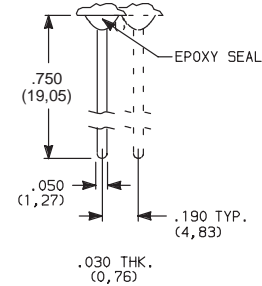
Z3 QUICK CONNECT



SPDT and DPDT

Not available with P, S or R contact material.
Mating quick connector available;
order part number 530100000, page A-61.

W WIRE WRAP

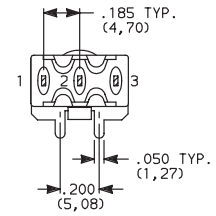
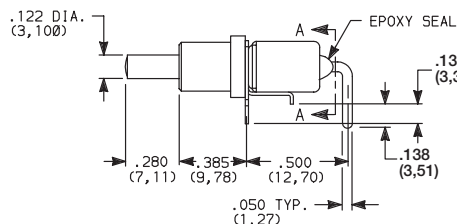
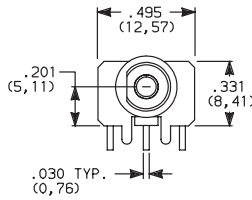


SPDT and DPDT

A RIGHT ANGLE, PC THRU-HOLE

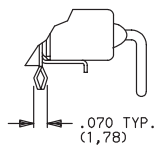
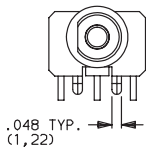


8161SH9ABE2
SPDT

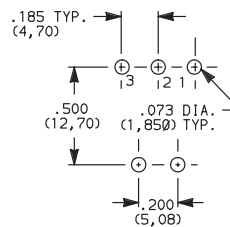


SECTION A-A

A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

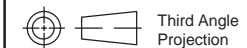


PC MOUNTING



Not available with I seal.
Terminal bend radii and lead-in manufacturing option.

NOTE: PC pattern must clear switch support leg.



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8060 Series Alternate Action and Momentary Pushbutton Switches

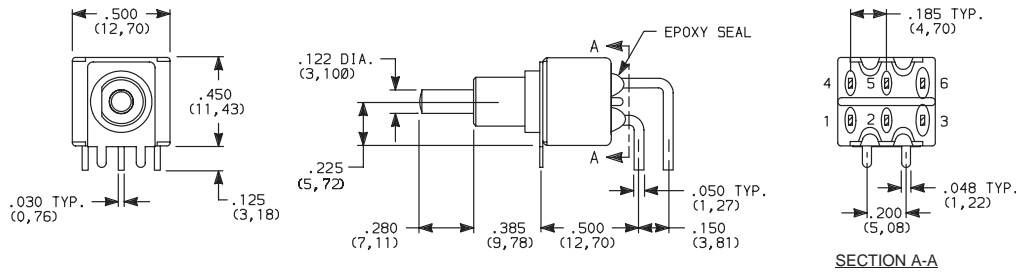


A

Pushbutton

TERMINATIONS

A RIGHT ANGLE, PC THRU-HOLE

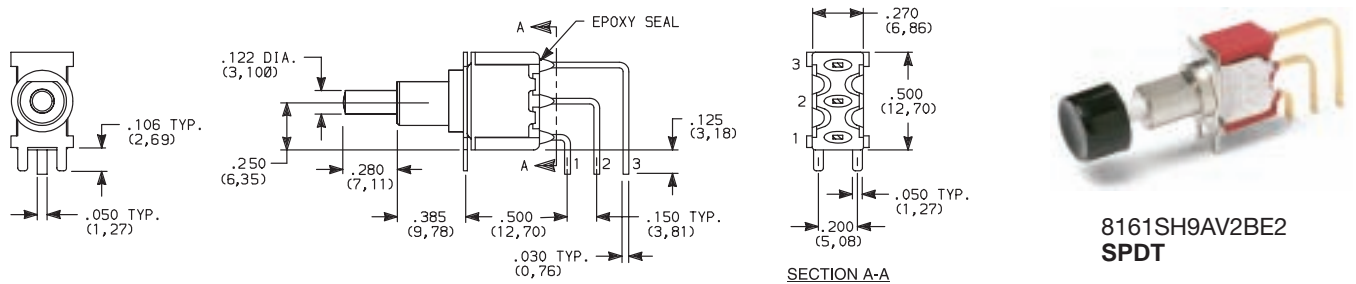


A3 RIGHT ANGLE, SNAP-IN, PC THRU-HOLE

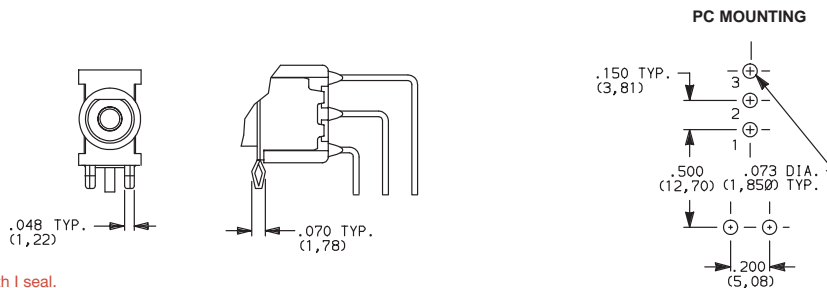


Not available with I seal.
Terminal bend radii and lead-in manufacturing option.

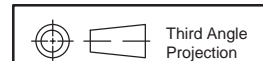
AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



Not available with I seal.
Terminal bend radii and lead-in manufacturing option.



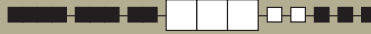
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





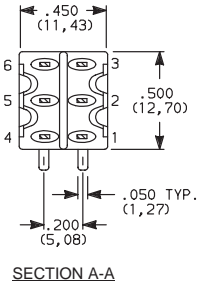
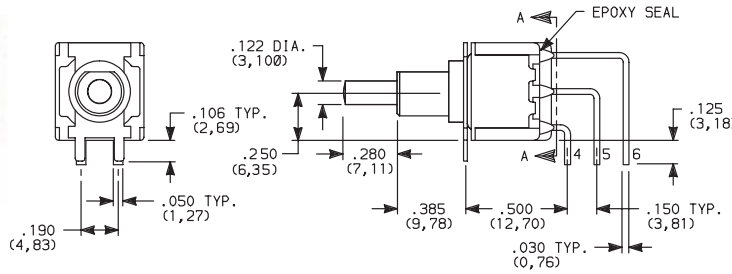
8060 Series Alternate Action and Momentary Pushbutton Switches

TERMINATIONS

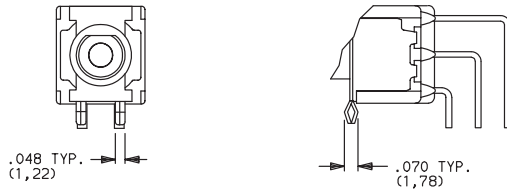


Pushbutton
A

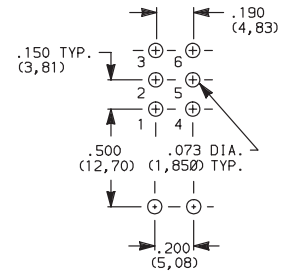
AV2 VERTICAL RIGHT ANGLE, PC THRU-HOLE, .150" PITCH



AV3 VERTICAL RIGHT ANGLE, SNAP-IN, PC THRU-HOLE, .150" PITCH



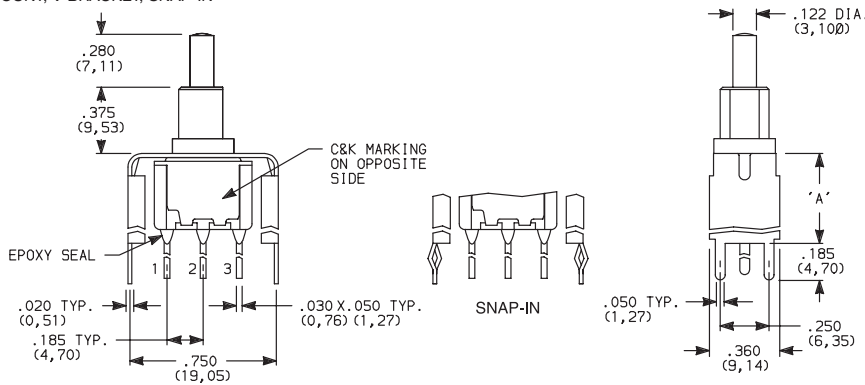
PC MOUNTING



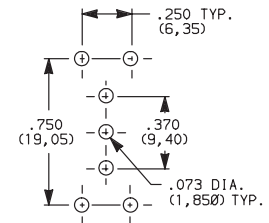
Not available with I seal.
Terminal bend radii and lead-in manufacturing option.

V6 VERTICAL MOUNT, V-BRACKET

V21 VERTICAL MOUNT, V-BRACKET, SNAP-IN



PC MOUNTING

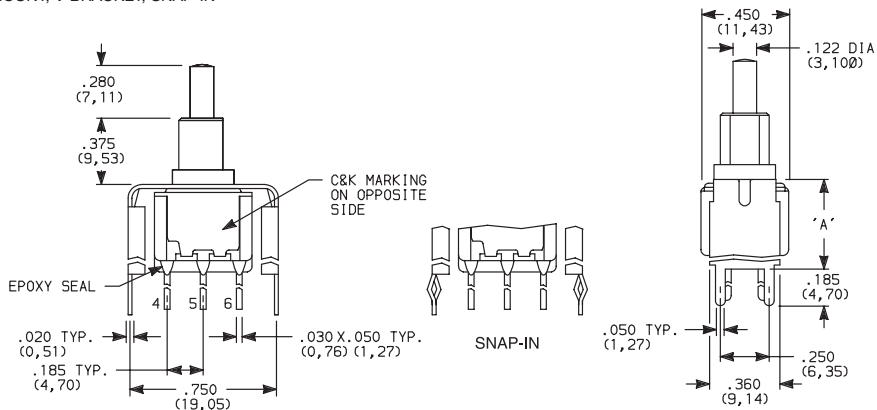


OPTION CODE	DIM 'A'
V21	.555 (14,10)
V6	.460 (11,68)

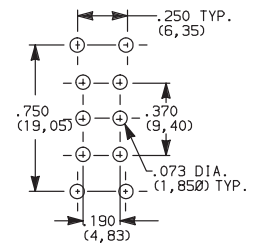
Not available with I seal.

V6 VERTICAL MOUNT, V-BRACKET

V21 VERTICAL MOUNT, V-BRACKET, SNAP-IN

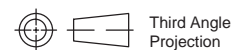


PC MOUNTING



OPTION CODE	DIM 'A'
V21	.555 (14,10)
V6	.460 (11,68)

Not available with I seal.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8060 Series Alternate Action and Momentary Pushbutton Switches



A

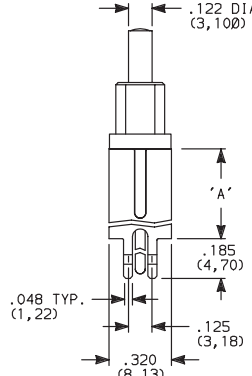
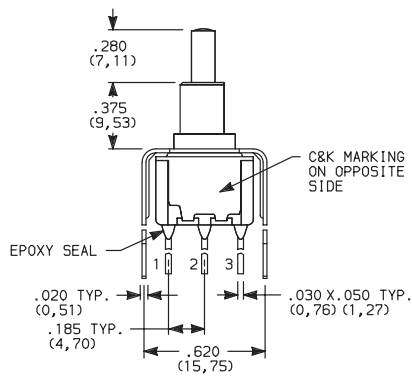
Pushbutton

TERMINATIONS

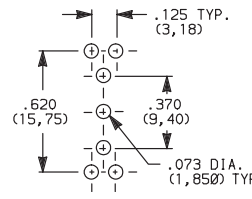


V3, V4 VERTICAL MOUNT, V-BRACKET

V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



PC MOUNTING



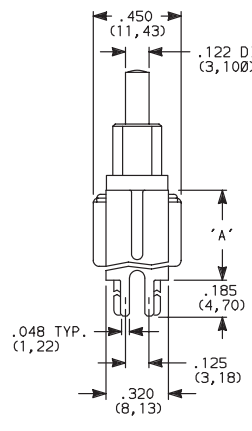
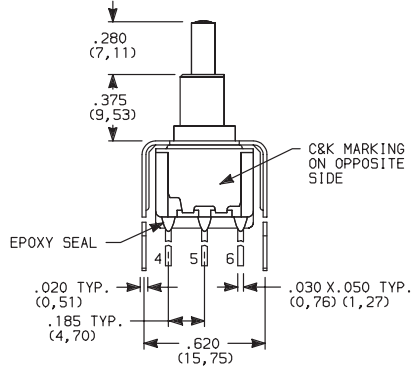
8161SH9_BE2
SPDT

OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4	.630 (16,00)

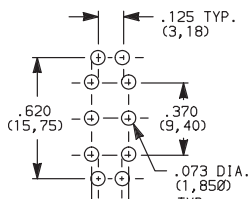
Not available with I seal.

V3, V4 VERTICAL MOUNT, V-BRACKET

V31 VERTICAL MOUNT, V-BRACKET, SNAP-IN



PC MOUNTING



8261SH9_BE2
DPDT

OPTION CODE	DIM 'A'
V3, V31	.460 (11,68)
V4	.630 (16,00)

Not available with I seal.

CONTACT MATERIAL



OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD ¹	GOLD ¹	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN ⁶		
Q	SILVER ^{4,5}	SILVER ⁵	POWER	6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
S		MATTE-TIN ⁶		
G	GOLD OVER SILVER ^{2,3}	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
R		MATTE-TIN ⁶		

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- ¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- ² END CONTACTS: Coin silver, with gold plate over nickel plate.
- ³ CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- ⁴ END CONTACTS: Coin silver, silver plated.
- ⁵ CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- ⁶ TERMINALS: Copper alloy, with matte-tin over nickel plate.

All models with all options when ordered with S, R, G, L, M or Q contact material.

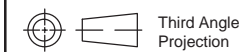
B contact material standard with all terminations except C, Z & Z3.

Q contact material standard with C, Z & Z3 terminations.

P, S & R contact materials not available with Z & Z3 terminations.

K, L and M options represent Non RoHS tin lead product and are not recommended for new designs. For additional information please contact Customer Service.

NOTE: Any models supplied with P, S, R, Q, B or G contact material are RoHS compliant.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

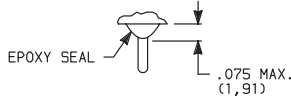


8060 Series Alternate Action and Momentary Pushbutton Switches

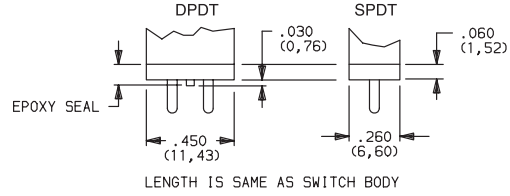
SEAL

Pushbutton
A

E EPOXY SEAL



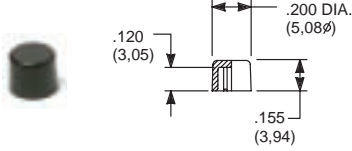
I EPOXY POTTED BASE



NOTE: Available with C, W, Z, Z3 terminations only.

AVAILABLE HARDWARE

Cap

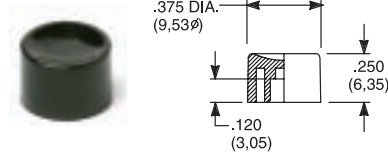


PART NO.

- 708901000 WHITE
- 708902000 BLACK
- 708903000 RED
- 708904000 ORANGE
- 708905000 YELLOW
- 708909000 GRAY

Material: Nylon
Finish: Gloss

Cap

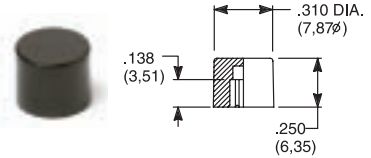


PART NO.

- 752701000 WHITE
- 752702000 BLACK
- 752703000 RED
- 752704000 ORANGE
- 752705000 YELLOW
- 752709000 GRAY

Material: Nylon
Finish: Gloss

Cap

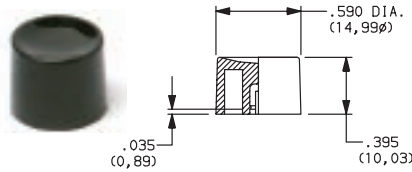


PART NO.

- 801801000 WHITE
- 801802000 BLACK
- 801803000 RED
- 801804000 ORANGE
- 801805000 YELLOW
- 801809000 GRAY

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

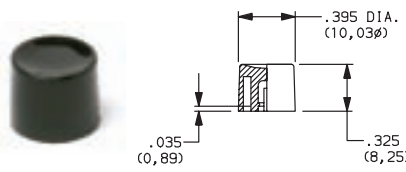


PART NO.

- 894001000 WHITE
- 894002000 BLACK
- 894003000 RED
- 894004000 ORANGE
- 894005000 YELLOW
- 894009000 GRAY

Material: Nylon
Finish: Gloss

Cap, Snap-fitting plunger

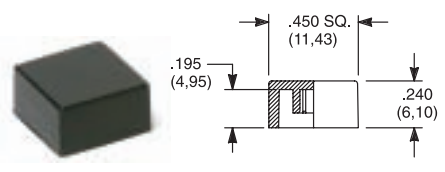


PART NO.

- 894101000 WHITE
- 894102000 BLACK
- 894103000 RED
- 894104000 ORANGE
- 894105000 YELLOW
- 894109000 GRAY

Material: Nylon
Finish: Gloss

Cap, J80, J81 & J82 options only



PART NO.

- 484601000 WHITE
- 484602000 BLACK
- 484603000 RED
- 484604000 ORANGE
- 484605000 YELLOW
- 484609000 GRAY

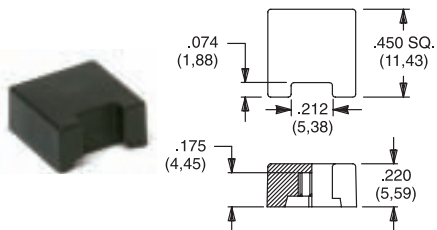
Material: Nylon
Finish: Gloss

PART NO.

- 798201000 WHITE
- 798202263 BLACK
- 798203000 RED
- 798204000 ORANGE
- 798205000 YELLOW
- 798209000 GRAY

Material: Nylon
Finish: Matte

Cap, J86 & J96 options only



PART NO.

- 459701000
- 459702000
- 459703000
- 459704000
- 459705000
- 459709000

Material: Nylon
Finish: Gloss

PART NO.

- 476801000 WHITE
- 476802000 BLACK
- 476803000 RED
- 476804000 ORANGE
- 476805000 YELLOW
- 476809000 GRAY

Material: Nylon
Finish: Matte

Frame



PART NO.

- 615602263 BLACK

Material: Nylon
Finish: Matte

Frame



PART NO.

- 613302263 BLACK

Material: Nylon
Finish: Matte

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware". Other cap & frame colors available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8060 Series Alternate Action and Momentary Pushbutton Switches



A

Pushbutton

AVAILABLE HARDWARE

Fits Z3 Termination
female connector

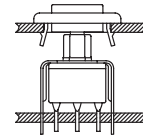
PART NO.
530100000

Available in loose pieces.



Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

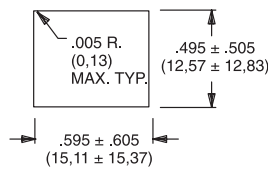
TYPICAL APPLICATION



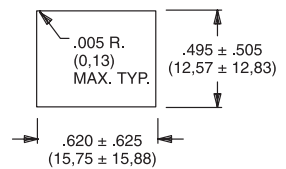
.047" (1,19) PANEL THK.	.062" (1,57) PANEL THK.	.090" (2,29) PANEL THK.	.125" (3,18) PANEL THK.
PART NO. 432502263	PART NO. 432602263	PART NO. 432702263	PART NO. 432802263 BLACK

PANEL MOUNTING

For part numbers
4325xxxxx, 4326xxxxx

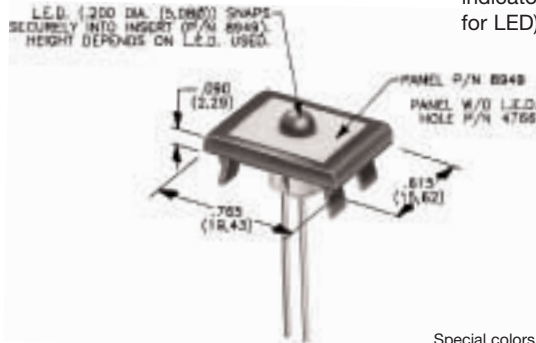


For part numbers
4327xxxxx, 4328xxxxx



Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT
WITH HOLE FOR LED

PART NO.
894902000

BLANK PANEL INSERT
WITHOUT HOLE FOR LED

PART NO.
476602000 BLACK

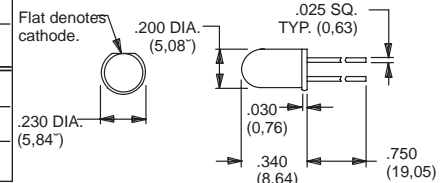
Special colors, custom markings available, consult Customer Service Center.

LED INFORMATION

SWITCHES WITH LED SUPPLIED: J86 OPTION:

Rectangular LEDs are supplied on 8060 Series pushbutton switches with J86 option. These LEDs are factory installed and are not replaceable. The following specifications apply:

OPTION CODE	COLOR	TYP. INTENSITY	TYP. FORWARD VOLTAGE	TYP. FORWARD CURRENT	MAX RATINGS AT 25°C AMBIENT TEMPERATURE		
					FORWARD VOLTAGE	CONTINUOUS FORWARD CURRENT	POWER DISSIPATION
6	Green	1.0 mcd	2.1 V	20 mA	2.5 V	50 mA	125 mW
3	Red*	0.5 mcd		10 mA		30 mA	75 mW
5	Yellow	4.0 mcd		20 mA		50 mA	125 mW



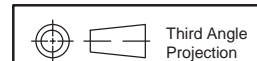
Suggested LED for J82 & J84 options.
Dimensions for reference only.

Process Information: Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

Caution: Circuit elements must limit forward current of LED to 50mA max. continuous.

* Extra-bright red LED available (typ. intensity 4.5 mcd), consult Customer Service Center.

LEDs are not supplied with J82 & J84 options. LED snaps into switch frame surrounding actuator and is wired externally.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





8500 Series Subminiature Pushbutton Switches



Features/Benefits

- *Pre-travel or over-travel models available*
- *Ratings up to 3 AMPS*
- *Reliable contact design*
- *RoHS compliant*

Typical Applications

- *Detection*
- *Telecommunications and networking equipment*
- *Computers and peripherals*



Models Available

Specifications

CONTACT RATING: Q contact material (853X Models): 1 AMP @ 120 V AC or 28 V DC; (855X Models): 3 AMPS @ 120 V AC or 28 V DC. See page A-65 for additional ratings.

ELECTRICAL LIFE:

853X MODELS: 250,000 actuations at full load.
855X MODELS: 10,000 actuations at full load.

CONTACT RESISTANCE: Below 30 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

NOTE: Any models supplied with Q, B or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE: Glass filled phenolic or diallyl phthalate (DAP) (UL 94V-0).

PLUNGER: Phenolic or glass filled polyester, black standard(UL94V-0).

CAP & FRAME: Nylon, black, standard.

BUSHING: Brass, nickel plated.

CONTACTS: Q contact material: Coin silver, silver plated. See page A-65 for additional contact materials.

TERMINALS: Q contact material: Copper alloy, silver plated. See page A-65 for additional contact materials.

TERMINAL SEAL: Epoxy.

HARDWARE: Nut: Brass, nickel plated; Lockwasher: Steel, bright nickel plated.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-63 thru A-66. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.

	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Switch Function							
8531 SPST Off-Mom. 1 Amp							
8532 SPST Off-Mom. 1 Amp							
8533 SPST On-Mom. 1 Amp							
8534 SPST On-Mom. 1 Amp							
8551 SPST Off-Mom. 3 Amps							
8552 SPST Off-Mom. 3 Amps							
Actuator or Plunger							
M .150" high							
J81 Snap-in with frame							
J82 Snap-in with frame for LED							
S .210" high							
T 15/32 bushing							
T1 15/32 bushing with frame (8532 and 8534 only)							
Terminations							
Z Solder lug							
AV Right angle, PC thru-hole							
C PC Thru-hole							
Contact Material							
Q Silver							
B Gold							
G Gold over silver							
Seal							
E Epoxy							
D No epoxy seal							
Cap or Plunger Color							
2 Black							
1 White							
3 Red							
9 Gray							
Frame Color							
2 Black							
NONE Models without frame							



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

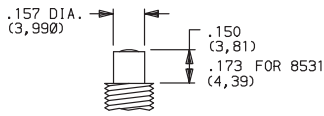


8500 Series Subminiature Pushbutton Switches

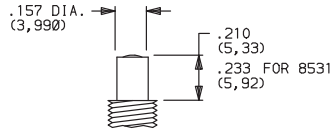
Pushbutton
A

PLUNGER

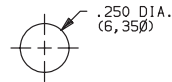
M .150" HIGH PLUNGER



S .210" HIGH PLUNGER



PANEL MOUNTING

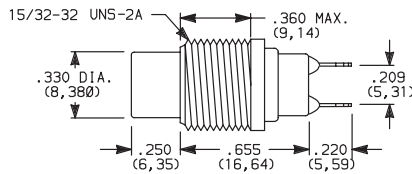


OPTION CODE	PLUNGER COLOR
2	BLACK
3	RED

NOTE: One mounting nut and lockwasher supplied with all actuators (except T actuator: two nuts supplied).

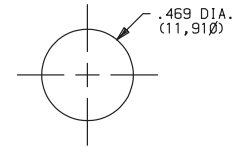
ACTUATOR

T 15/32 BUSHING



NOTE: No frame color choice required.

PANEL MOUNTING



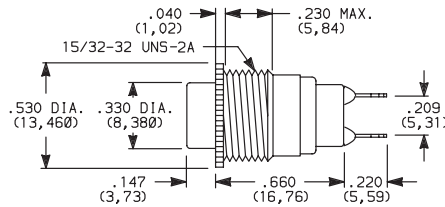
OPTION CODE	CAP COLOR
2	BLACK
1	WHITE
3	RED
9	GRAY

Cap Finish: gloss. Other colors available, consult Customer Service Center.

One mounting nut and lockwasher supplied with all actuators (except T actuator: two nuts supplied).

NOTE: Caps available for plunger options, see page A-65.

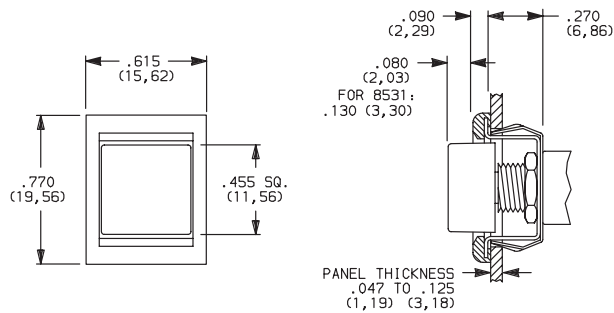
T1 15/32 BUSHING WITH FRAME



NOTE: No frame color choice required. Available with 8532 and 8534 models only.

ACTUATOR—SNAP-IN FRONT MOUNT

J81 SNAP-IN WITH FRAME



OPTION CODE	CAP AND FRAME COLOR
2	BLACK

Cap and Frame Finish: matte. Other colors available, consult Customer Service Center.

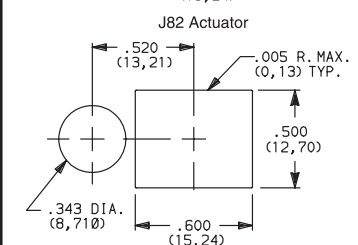
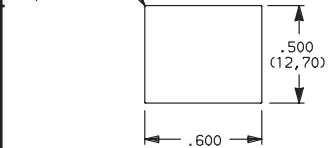
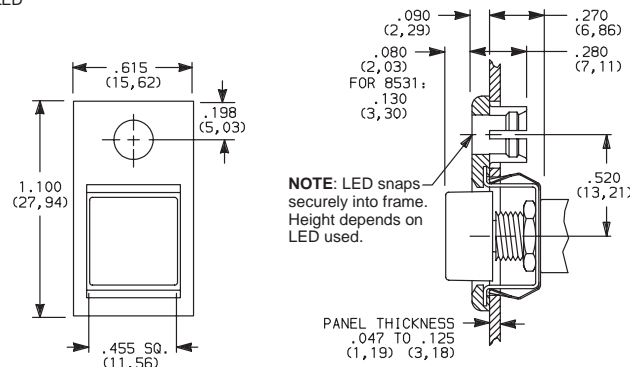
One mounting nut and lockwasher supplied with all actuators.

NOTE: Caps & frames available separately, see pages A-65 and A-66.

PANEL MOUNTING



J82 SNAP-IN WITH FRAME FOR LED



LED not included. For LED information, see page A-66.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



8500 Series Subminiature Pushbutton Switches



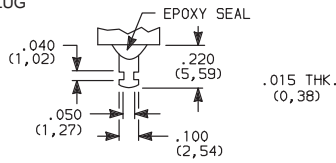
A

Pushbutton

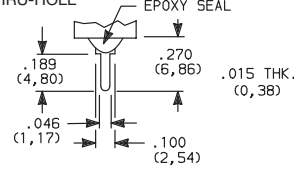
TERMINATIONS



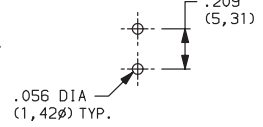
Z SOLDER LUG



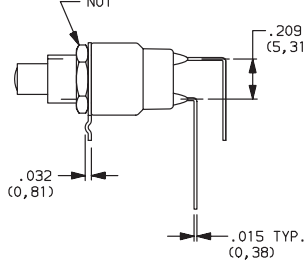
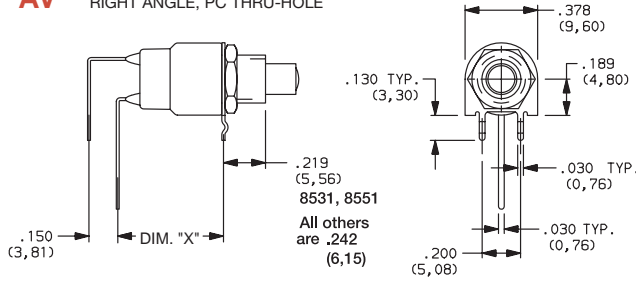
C PC THRU-HOLE



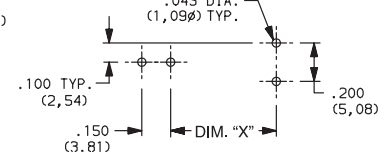
PC MOUNTING



AV RIGHT ANGLE, PC THRU-HOLE



PC MOUNTING



MODEL NO.	DIM "X"
8531, 8533, 8551	0.550
8532, 8534, 8552	0.438

NOTE: Available with M or S plunger models only

CONTACT MATERIAL



OPTION CODE	RoHS COMPLIANT *	RoHS COMPATIBLE *	TERMINAL PLATING	CONTACT MATERIAL	RATINGS	
B	YES	YES	GOLD ¹	GOLD	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	YES	YES	SILVER ⁴	SILVER ⁵	POWER	853X MODELS: 1 AMP @ 120 V AC OR 28 V DC. 855X MODELS: 3 AMPS @ 120 V AC OR 28 V DC.
G	YES	YES	GOLD OVER SILVER ²	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 V MAX @20 V AC OR DC MAX. OR 853X MODELS: 1 AMP @ 120 V AC OR 28 V DC. 855X MODELS: 3 AMPS @120 V AC OR 28 V DC.

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

- CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- CONTACTS: Coin silver, with gold plate over nickel plate.
- TERMINALS: Copper alloy, with gold plate over nickel plate.
- CONTACTS: Coin silver, silver plated.
- TERMINALS: Copper alloy, silver plated.

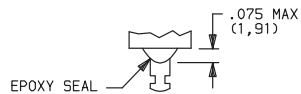
NOTE: Any models supplied with Q, B or G contact material are RoHS compliant.

All models with all options when ordered with G or Q contact material.
Q contact material standard with C, Z terminations.
8551 & 8552 available with Q contact material only.

SEAL

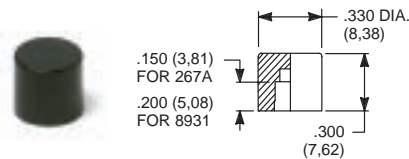


E EPOXY SEAL



REPLACEMENT HARDWARE

Cap for 0.157" dia. plungers

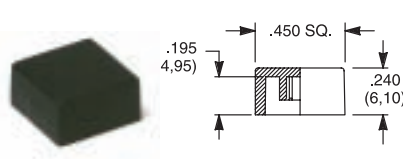


PART NO.	COLOR	PART NO.	COLOR
267A01000	WHITE	893101000	WHITE
267A02000	BLACK	893102000	BLACK
267A03000	RED	893103000	RED
267A09000	GRAY	893109000	GRAY

85X2T, 8534T models only
Material: Nylon
Finish: Gloss

85X1T, 8532T1, 8533T, 8534T1 models only
Material: Nylon
Finish: Gloss

Cap, J80, J81 & J 82 options only



PART NO.	COLOR
448901000	WHITE
448902000	BLACK
448903000	RED
448909000	GRAY

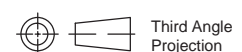
Material: Nylon
Finish: Gloss or matte

Frame



PART NO.	COLOR
613302263	BLACK

Material: Nylon
Finish: Matte



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



Other colors available, consult Customer Service Center.



8500 Series Subminiature Pushbutton Switches

AVAILABLE HARDWARE

Pushbutton
A

Frame



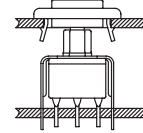
PART NO.
615602263 BLACK

Material: Nylon
Finish: Matte

NOTE: Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".
Other colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

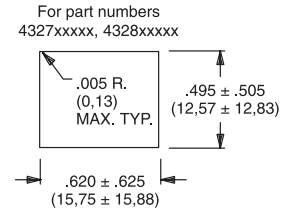
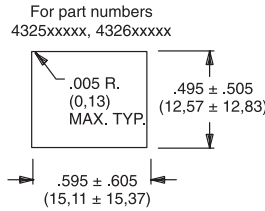
TYPICAL APPLICATION



.047" (1,19) PANEL THK. .062" (1,57) PANEL THK. .090" (2,29) PANEL THK. .125" (3,18) PANEL THK.

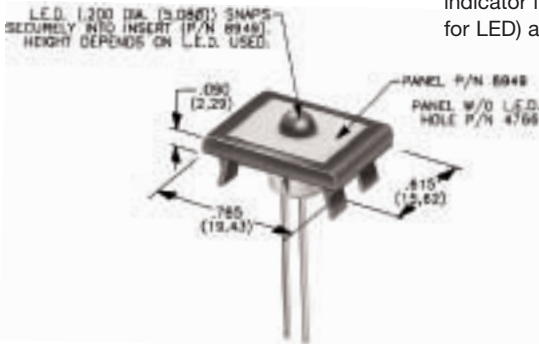
PART NO. **PART NO.** **PART NO.** **PART NO.**
432502263 **432602263** **432702263** **432802263** BLACK

PANEL MOUNTING



Panel Inserts

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included.



PANEL INSERT
WITH HOLE FOR LED

PART NO.
894902000

BLANK PANEL INSERT
WITHOUT HOLE FOR LED

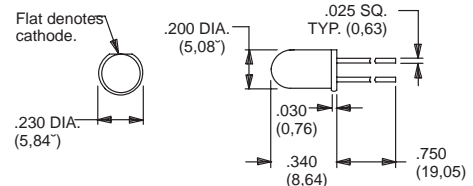
PART NO.
476602000 BLACK

Special colors, custom markings available, consult Customer Service Center.

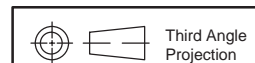
LED INFORMATION

Process Information: Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.

LEDs are not supplied with J82 option. LED snaps into switch frame surrounding actuator and is wired externally.



Suggested LED for J82 option.
Dimensions for reference only.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

KM Series Subminiature Pushbutton Switches



Features/Benefits

- **Reliable contact design**
- **Available with pretravel and overtravel**
- **Extended overtravel option**
- **RoHS compliant**

Typical Applications

- **Alarm systems**
- **Computers**
- **Detector switch application**



Models Available

Specifications

CONTACT RATING: Q contact material (KM11, KM12 Models): 0.25 AMPS @ 125 V AC or DC (UL); (KM33 Model): 1 AMP @ 125 V AC or 28 V DC. See page A-69 for additional ratings.

ELECTRICAL LIFE: 10,000 actuations min. at full load.

CONTACT RESISTANCE: Below 30 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10⁹Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

NOTE: Any models supplied with Q or B contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

HOUSING & BUSHING: 6/6 nylon (UL94V-2), black.

ACTUATOR: 6/6 nylon (UL 94V-2), natural. Internal o-ring seal, available on KM11 & KM33 models.

MOVABLE CONTACT: B contact material: Bronze or copper, with gold plate over nickel plate. See page A-69 for additional contact materials.

STATIONARY CONTACTS & TERMINALS: B contact material: Copper, with gold plate over nickel plate. See page A-69 for additional contact materials.

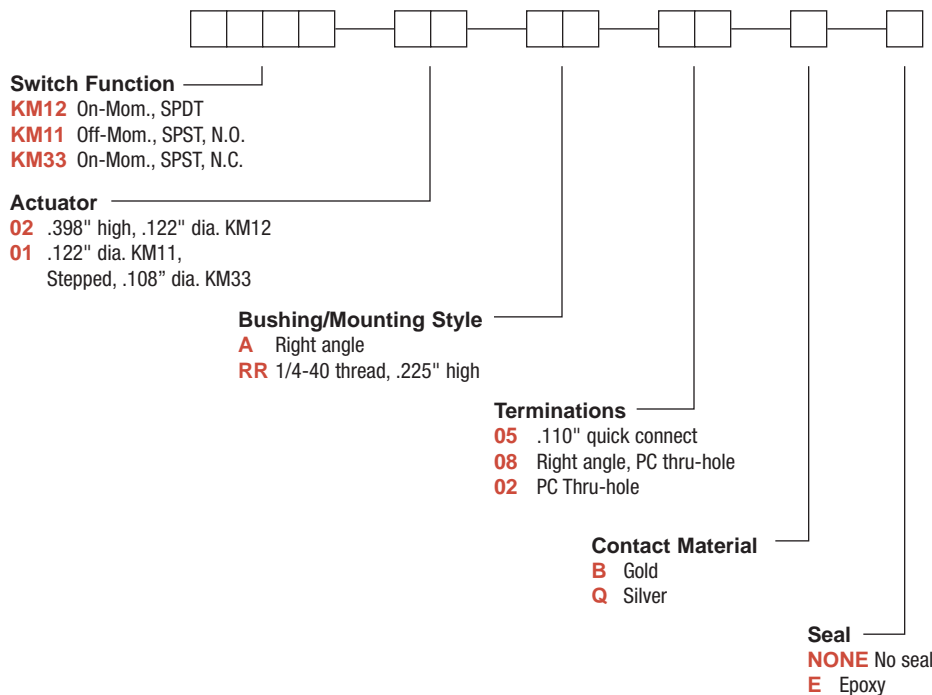
RETURN SPRING: Music wire, phosphor coated.

MOUNTING NUT: Brass, nickel plated.

TERMINAL SEAL: Epoxy.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-68 and A-70. For additional options not shown in catalog, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



KM Series Subminiature Pushbutton Switches

Pushbutton
A

SWITCH FUNCTION

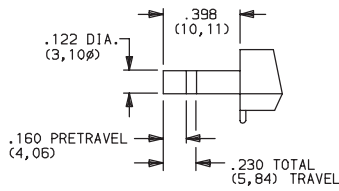


NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	KM11	OFF	MOM.	OPEN	2-1	SPST N.O.
	KM33	ON	MOM.	2-1	OPEN	SPST N.C.
SPST <p>Part number shown: KM1101RR05BE</p>						
SP	KM12	ON	MOM.	2-1	4-3	SPDT
SPDT <p>Part number shown: KM1202A08BE</p>						

ACTUATOR

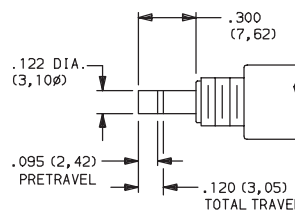


02 .398" HIGH, .122" DIA.

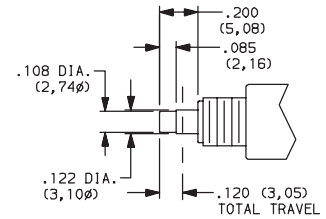


KM12 models only.

01 .122" DIA.



KM11 models only.



KM33 models only.

NOTE: Caps available for plunger options, see page A-70.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



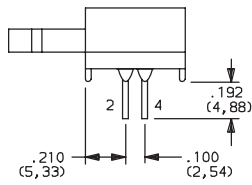
KM Series Subminiature Pushbutton Switches



BUSHING/ MOUNTING STYLE

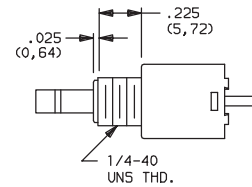


A RIGHT ANGLE



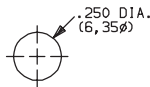
KM12 models only.

RR 1/4-40 THREAD, .225" HIGH



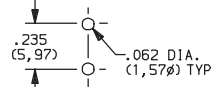
KM11 & KM33 models only.

PANEL MOUNTING

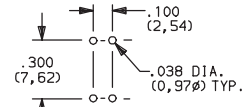


KM11 & KM33 models.

PC MOUNTING



KM11 models only.

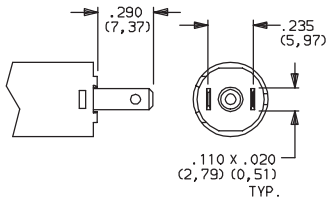


KM12 models only.

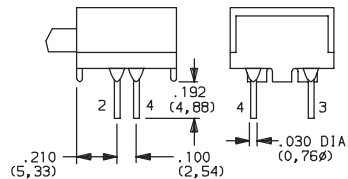
TERMINATIONS



05 .110" QUICK CONNECT

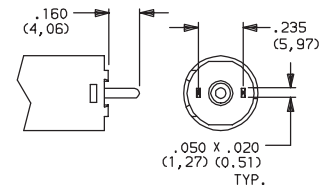


08 RIGHT ANGLE, PC THRU-HOLE



KM12 models only.

02 PC THRU-HOLE



KM11 models only.

CONTACT MATERIAL



OPTION CODE	RoHS COMPLIANT *	RoHS COMPATIBLE *	CONTACT AND TERMINAL MATERIAL	RATINGS	
B	YES	YES	GOLD ¹	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	YES	YES	SILVER ²	POWER	0.25 AMPS @ 125 V AC OR DC (KM11, KM12) (UL) 1 AMP @ 125 V AC OR 28 V DC (KM33).


* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

¹ STATIONARY CONTACTS & TERMINALS: Copper, with gold plate over nickel plate. MOVABLE CONTACT: Phosphor bronze or beryllium copper, with gold plate over nickel plate.

² STATIONARY CONTACTS & TERMINALS: Copper, silver plated (standard with all termination options). MOVABLE CONTACT: Phosphor bronze or beryllium copper, silver plated.

³ STATIONARY CONTACTS & TERMINALS: Copper, with gold plate over nickel plate over silver plate. MOVABLE CONTACT: Phosphor bronze or beryllium copper, with gold plate over nickel plate over silver plate.

NOTE: Any models supplied with Q or B contact material are RoHS compliant.

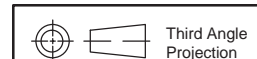
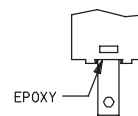
KM11, KM12 models  when ordered with 'Q' contact material.

SEAL



NONE NO SEAL

E EPOXY SEAL



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



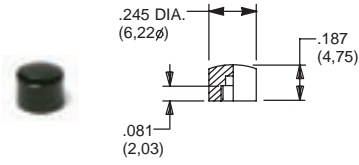


KM Series Subminiature Pushbutton Switches

AVAILABLE HARDWARE

Pushbutton
A

Cap, KM33 models

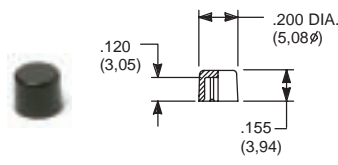


PART NO.

- 785101000** WHITE
- 785102000** BLACK
- 785103000** RED

Material: Nylon
Finish: Gloss

Cap, KM11 models

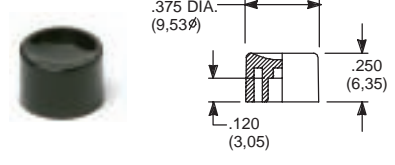


PART NO.

- 708901000** WHITE
- 708902000** BLACK
- 708903000** RED

Material: Nylon
Finish: Gloss

Cap, KM11 models

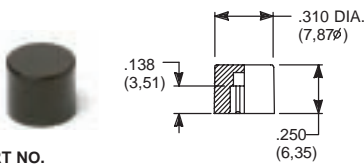


PART NO.

- 752701000** WHITE
- 752702000** BLACK
- 752703000** RED

Material: Nylon
Finish: Gloss

Cap, KM11 models

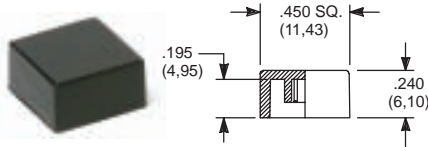


PART NO.

- 801801000** WHITE
- 801802000** BLACK
- 801803000** RED

Material: Nylon
Finish: Gloss

Cap, KM11 models



PART NO.

- 484601000** WHITE
- 484602000** BLACK
- 484603000** RED

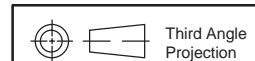
Material: Nylon
Finish: Gloss

PART NO.

- 798201000** WHITE
- 798202263** BLACK
- 798203000** RED

Material: Nylon
Finish: Matte

NOTE: Other cap colors available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

8600 Series Microminiature Pushbutton Switches



Features/Benefits

- Available with overtravel
- Normally closed models available
- Microminiature size ideal for applications where space is limited
- RoHS compliant

Typical Applications

- Detection
- Telecommunications and networking equipment
- Computers and peripherals



Models Available

Specifications

CONTACT RATING: Q contact material (8631, 8632 Models): 500 mA @ 120 V AC or 28 V DC; 250 mA @ 250 V AC; (8633 Model): 250 mA @ 120 V AC or 28 V DC; 125 mA @ 250 V AC. See page A-73 for additional ratings.

ELECTRICAL LIFE:
8631 and 8633 MODELS: 250,000 actuations at full load.
8632 MODEL: 100,000 actuations at full load.

CONTACT RESISTANCE: Below 30 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 109 Ω min.

DIELECTRIC STRENGTH: 500 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9.

Materials

CASE: Glass filled phenolic or diallyl phthalate (DAP), (UL94V-0).

PLUNGER: Glass filled nylon (UL94V-0), black standard.

BUSHING: Brass, nickel plated.

CONTACTS: Q contact material: Coin silver, silver plated.
See page A-73 for additional contact materials.

TERMINALS:
8631, 8632 MODELS: Copper alloy, silver plated.
8633 MODEL: Q contact material: Coin silver.
See page A-73 for additional contact materials.

TERMINAL SEAL:
8633 MODEL: Epoxy.
8631, 8632 MODELS: Terminals insert molded.

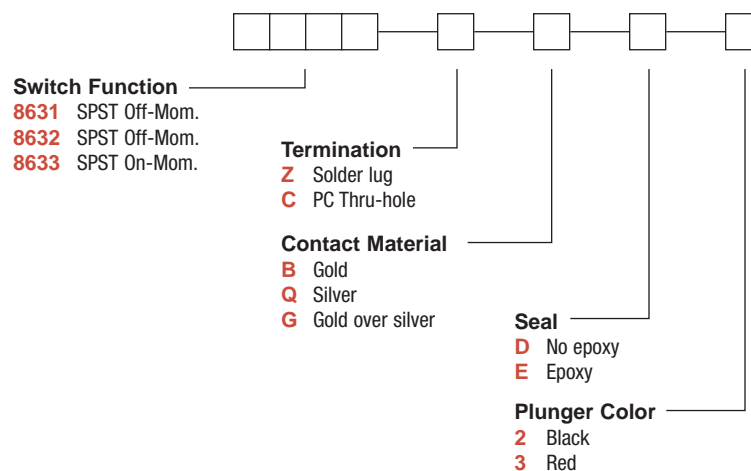
HARDWARE: Nut: Brass, nickel plated.

NOTE: Any models supplied with Q, B or G contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-72 and A-73. For additional options not shown in catalog, consult Customer Service Center.





8600 Series Microminiature Pushbutton Switches

SWITCH FUNCTION



Pushbutton

A

NO. POLES	MODEL NO.	SWITCH FUNCTION		TOTAL TRAVEL	ACTUATION FORCE	SCHEMATIC
		POS. 1	POS. 2			
SP	8631	OFF	MOM.	.040 (1,02) TYP.	5 oz (140g) TYP.	N.O.
SPST <p>Part number shown: 8631ZQD2</p> <p>Terminals Insert Molded</p>						
SP	8632	OFF	MOM.	.106 (2,69) TYP. with overtravel .024 (0,61) TYP.	6.25 oz (177g) TYP.	N.O. with overtravel
SPST <p>Part number shown: 8632ZQD2</p> <p>Terminals Insert Molded</p>						
SP	8633	ON	MOM.	.048 (1,22) TYP.	5 oz (140g) TYP.	N.C.
SPST <p>Part number shown: 8633ZQE2</p>						

MOM. = Momentary

NOTE: Caps available for plunger options, see page A-73.

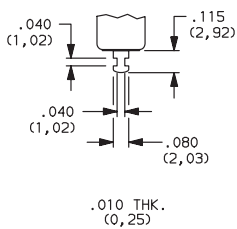
TERMINATIONS



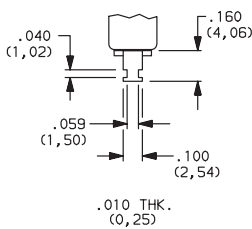
Z SOLDER LUG

C PC THRU-HOLE

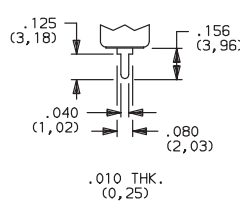
8631, 8632 models only.



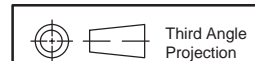
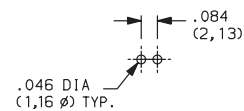
8633 models only.



8631, 8632 models only.



PC MOUNTING



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

8600 Series Microminiature Pushbutton Switches



A

Pushbutton

CONTACT MATERIAL

OPTION CODE	RoHS COMPLIANT *	RoHS COMPATIBLE *	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	YES	YES	GOLD ¹	GOLD ¹	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
Q	YES	YES	SILVER ⁴	SILVER ⁵	POWER	8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC. 8633 MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC.
G	YES	YES	GOLD OVER SILVER ⁴	GOLD ³	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @ 250 V AC. 8633 MODELS: 250 mA @ 120 V AC OR 28 V DC; 125 mA @ 250 V AC.

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

¹ CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.


² CONTACTS: Coin silver, with gold plate over nickel plate.

³ TERMINALS: Copper alloy, with gold plate over nickel plate.
8633 model only: Coin silver, with gold plate over nickel plate.

⁴ CONTACTS: Coin silver, silver plated.

⁵ TERMINALS: Copper alloy, silver plated. 8633 model only: coin silver.

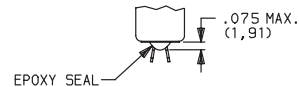
NOTE: Any models supplied with Q, B or G contact material are RoHS compliant.

8631, 8632 models  with all options when ordered with G or Q contact material.
Q contact material standard with C, Z terminations.

SEAL

D NO EPOXY SEAL

E EPOXY SEAL



Not available on 8633 model.
Standard on 8631, 8632 models.

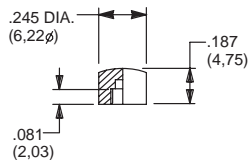
Not available on 8631, 8632 models.
Standard on 8633 model only.

PLUNGER COLOR

OPTION CODE	COLOR
2	BLACK
3	RED

AVAILABLE HARDWARE

Cap



PART NO.
785101000 WHITE
785102000 BLACK
785103000 RED

Material: Nylon
Finish: Gloss

NOTE: Other cap colors available, consult Customer Service Center.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

C&K



8700 Series Overtravel Pushbutton Switches

A

Pushbutton



Features/Benefits

- *Extended pre-travel or over-travel*
- *Heavy-duty brass plunger*
- *Long electrical life — 100K cycles*
- *RoHS compliant*

Typical Applications

- *Telecommunications*
- *High end Instrumentation*
- *Medical & test equipment*
- *Detection*

Specifications

CONTACT RATING: Q contact material: 1 AMP @ 120 V AC or 28 V DC. See page A-76 for additional ratings.

ELECTRICAL LIFE: 100,000 actuations at full load.

CONTACT RESISTANCE: Below 30 mΩ typ. Initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10³Ω min.

DIELECTRIC STRENGTH: 1,000 Vrms min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

NOTE: Any models supplied with Q, or B contact material are RoHS compliant.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Materials

CASE: Diallyl phthalate (DAP) (UL 94V-0).

PLUNGER:

8731 – .390" brass, nickel plated.

8732 – .390" PBT polyester, black.

BUSHING: brass, nickel plated.

CONTACTS: Q contact material: Coin silver, silver plated. See page A-76 for additional contact materials.

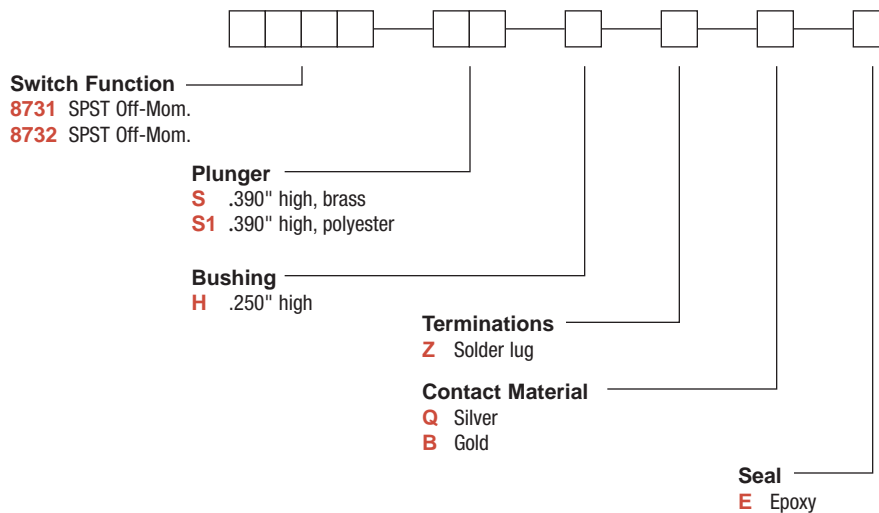
TERMINALS: Q contact material: Copper alloy, silver plated. See page A-76 for additional contact materials.

TERMINAL SEAL: Epoxy.

HARDWARE: Nut: Brass, nickel plated; lockwasher: Steel, bright nickel plate. One mounting nut & lockwasher supplied with all switches.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-75 and A-76. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

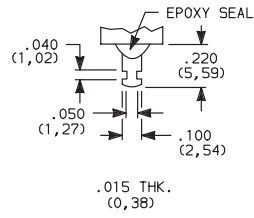


8700 Series Overtravel Pushbutton Switches

Pushbutton
A

TERMINATIONS

Z SOLDER LUG



CONTACT MATERIAL

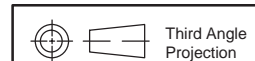
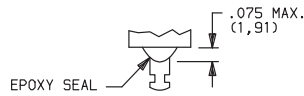
OPTION CODE	RoHS COMPLIANT *	RoHS COMPATIBLE *	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
					POWER	
Q	YES	YES	SILVER	SILVER		1 AMP @ 125 V AC OR 28 V DC.
B	YES	YES	GOLD	GOLD	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.

* Note: See Technical Data section of this catalog for RoHS compliant and compatible definition and specifications.

NOTE: Any models supplied with Q, or B contact material are RoHS compliant.

SEAL

E EPOXY SEAL



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

GP Series Sealed Ultraminiature Pushbutton Switches



Features/Benefits

- **Ultraminiature design saves space**
- **Process compatible, withstands most soldering and washing processes**
- **Thru-hole and surface mount models available**
- **Sealed construction—internal o-ring and epoxy base**
- **RoHS compliant**

Typical Applications

- **Telecommunications and network equipment**
- **Computers and peripheral products**
- **Instrumentation**
- **Medical Applications**



Specifications

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.
 MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.
 CONTACT RESISTANCE: Below 50 mΩ typ. initial @ 2-4 V DC, 100 mA.
 INSULATION RESISTANCE: 10⁹Ω min.
 DIELECTRIC STRENGTH: 500 Vrms min. @ sea level.
 OPERATING TEMPERATURE: -30°C to 85°C.
 SOLDERABILITY: Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).
 DEGREE OF PROTECTION: IP57; Protection against harmful dust deposit, full-scale voltage protection, temporary immersion.
 PACKAGING: Surface mount switches standard in anti-static tape and reel packaging per EIA 481-3, see page A-80 for drawings and reel information. Thru-Hole parts are shipped in trays.
 All models are RoHS compliant and compliant.

Materials

HOUSING & BASE: Glass filled nylon 4/6, flame retardant, heat stabilized (UL 94V-0).
 ACTUATOR: Glass filled nylon 4/6, flame retardant (UL 94V-0) with standard internal o-ring seal.
 SWITCH SUPPORT: Brass, tin plated.
 MOVABLE CONTACT: Copper alloy, with gold plate over nickel plate.
 STATIONARY CONTACTS Copper alloy, with gold plate over nickel plate.
 TERMINALS: Copper alloy, with gold flash over nickel plate.
 TERMINAL SEAL: Epoxy/Urethane. All terminals insert molded.

NOTE: Any models supplied with B contact material are RoHS compliant and compatible.

NOTE: Materials listed above are general specifications. Specifications available for specific and custom switches, consult Customer Service Center.

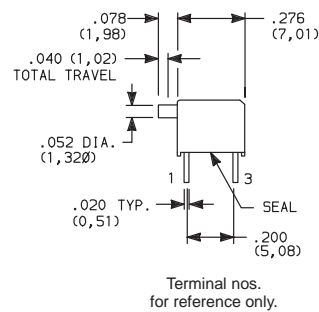
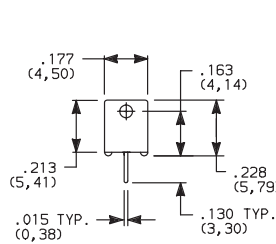
CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be taken in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

How To Order

Complete part numbers for GP Series Sealed Ultraminiature Pushbutton Switches are shown on pages A-78 thru A-80.

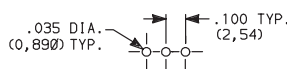
PART NUMBER	SWITCH FUNCTION		SCHEMATIC
	POS. 1	POS. 2	
GP11MCBE	OFF	MOM.	 1 3 SPST
Conn. Terms.	OPEN	1-3	
GP12MCBE	ON	MOM.	 NC 1 2 (COMM) 3 NO SPDT
Conn. Terms.	2-1	2-3	

MOM. = Momentary

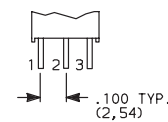


GP11MCBE SPST

PC MOUNTING



GP11—omit center hole.



GP12 Model



Dimensions are shown: Inches (mm)
 Specifications and dimensions subject to change



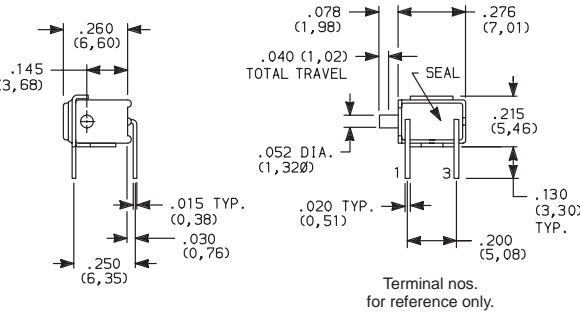
GP Series Sealed Ultraminiature Pushbutton Switches

A

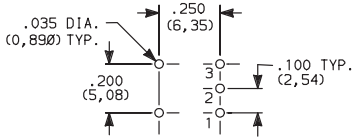
Pushbutton



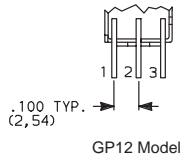
**GP11MABE
SPST**



PC MOUNTING



GP11- omit hole 2.



GP12 Model

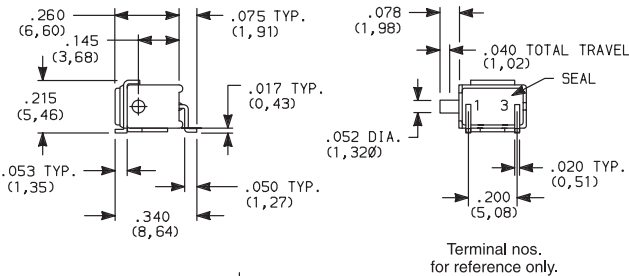
PART NUMBER	SWITCH FUNCTION		SCHEMATIC
	POS.1	POS. 2	
GP11MABE	OFF	MOM.	 SPST
Conn. Terms.	OPEN	1-3	
GP12MABE	ON	MOM.	 SPDT
Conn. Terms.	2-1	2-3	

MOM. = Momentary

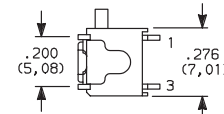
SMT



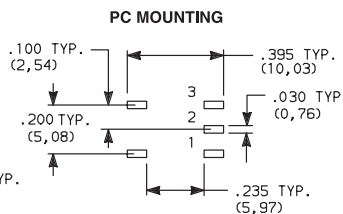
**GP11MSABE
SPST**



Terminal nos.
for reference only.



GP12 Model



GP11- omit pad 2.

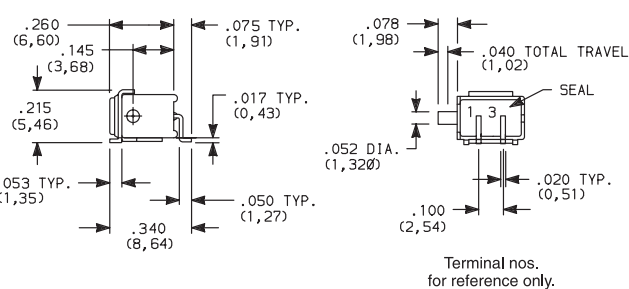
PART NUMBER	SWITCH FUNCTION		SCHEMATIC
	POS.1	POS. 2	
GP11MSABE	OFF	MOM.	 SPST
Conn. Terms.	OPEN	1-3	
GP12MSABE	ON	MOM.	 SPDT
Conn. Terms.	2-1	2-3	

MOM. = Momentary

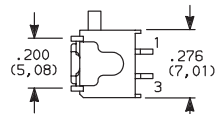
SMT



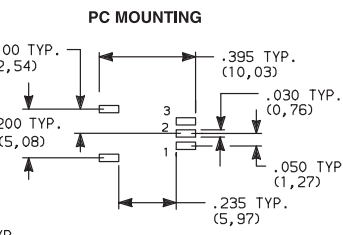
**GP11MSA1BE
SPST**



Terminal nos.
for reference only.



GP12 Model



GP11- omit pad 2.

PART NUMBER	SWITCH FUNCTION		SCHEMATIC
	POS.1	POS. 2	
GP11MSA1BE	OFF	MOM.	 SPST
Conn. Terms.	OPEN	1-3	
GP12MSA1BE	ON	MOM.	 SPDT
Conn. Terms.	2-1	2-3	

MOM. = Momentary



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

GP Series Sealed Ultraminiature Pushbutton Switches

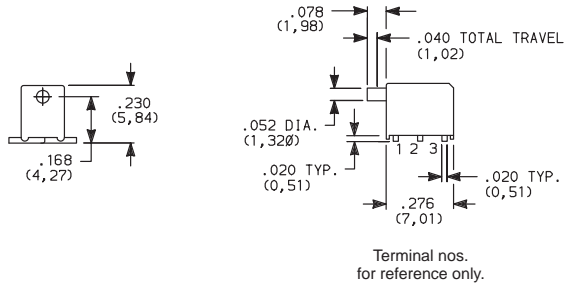


A

Pushbutton

PART NUMBER	SWITCH FUNCTION		SCHEMATIC
	POS. 1	POS. 2	
GP12MSCBE	ON	MOM.	 SPDT
Conn. Terms.	2-1	2-3	

MOM. = Momentary



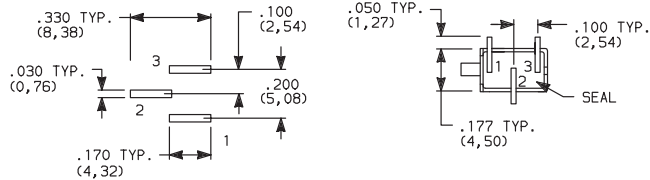
SMT



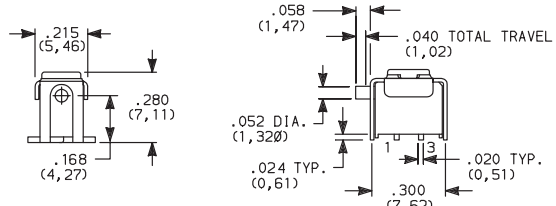
GP12MSCBE SPDT

Terminal nos. for reference only.

PC MOUNTING



NOTE: Recommended for infrequent use applications only
For increased switch mounting strength, order, SV1 termination style with support bracket (see below).



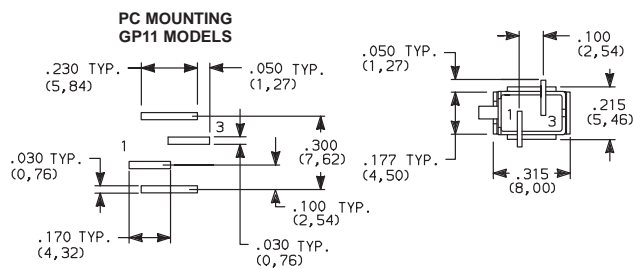
SMT



GP11MSV1BE SPST

PART NUMBER	SWITCH FUNCTION		SCHEMATIC
	POS. 1	POS. 2	
GP11MSV1BE	OFF	MOM.	 SPST
Conn. Terms.	OPEN	1-3	
GP12MSV1BE	ON	MOM.	 SPDT
Conn. Terms.	2-1	2-3	

MOM. = Momentary

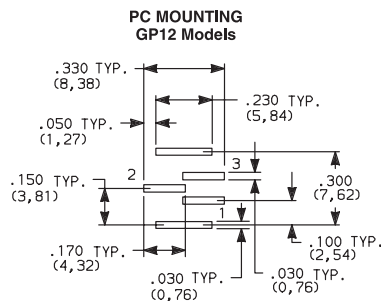


PC MOUNTING GP11 MODELS

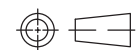


GP12 Model

Terminal nos. for reference only.



PC MOUNTING GP12 Models



Third Angle Projection

Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





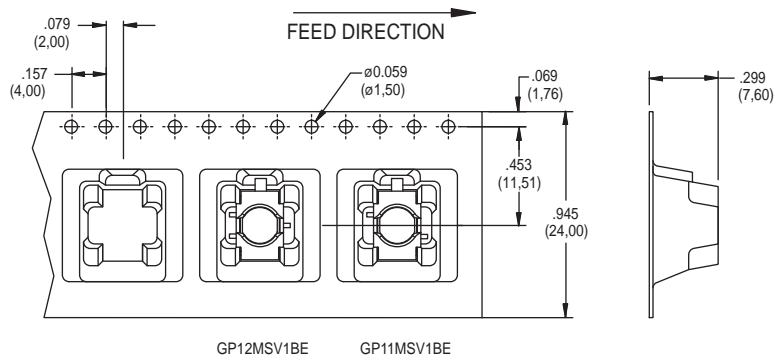
GP Series Sealed Ultraminiature Pushbutton Switches

TAPE & REEL

Pushbutton
A

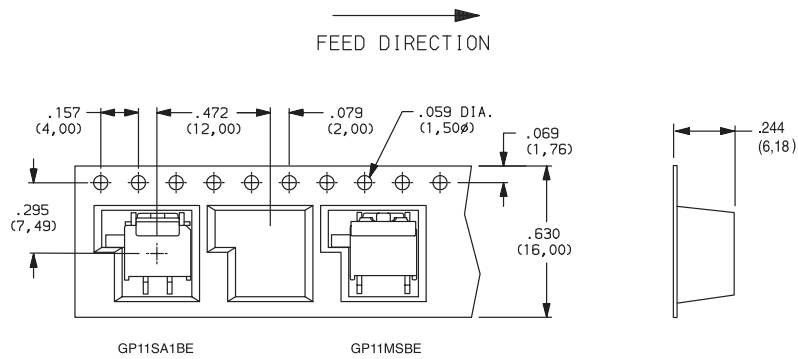
For part numbers GP11MSV1BE, GP12MSV1BE

REEL INFORMATION	
OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.512 (13,0)
QUANTITY PER REEL	600



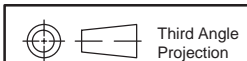
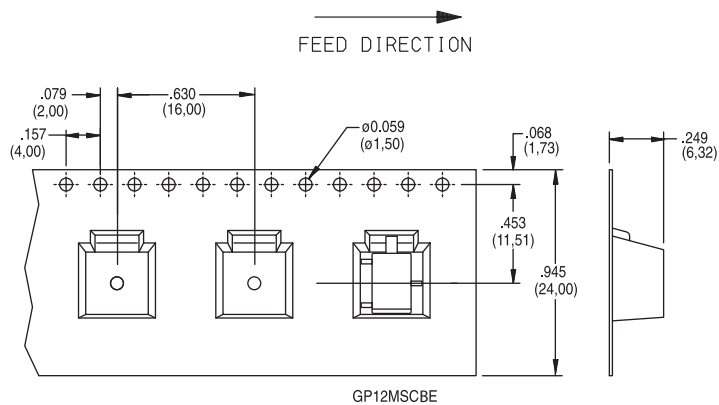
For part numbers GPXXSA1BE, GPXXMSABE

REEL INFORMATION	
OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.512 (13,0)
QUANTITY PER REEL	600



For part numbers GP12MSCBE

REEL INFORMATION	
OUTSIDE DIAMETER	13.00 (330,0)
PILOT HOLE	.512 (13,0)
QUANTITY PER REEL	600



Third Angle
Projection

Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



PN Series Alternate & Momentary Action Pushbutton Switches

Features/Benefits

- Momentary or locking action
- 3 actuation forces for customized feel
- Low cost, reliable contact design
- 1-4 poles available
- RoHS compliant

Typical Applications

- Computers and peripherals
- Instrumentation and measurement equipment
- Non-power, on-off switch applications



Specifications

CONTACT RATING: 0.2 AMP @ 30 V DC max.
 ELECTRICAL LIFE: 10,000 make-and-break cycles at full load.
 MECHANICAL LIFE: 10,000 on/off cycles.
 CONTACT RESISTANCE: 50 mΩ max. initial,
 100 milliohms max. at end of life.
 INSULATION RESISTANCE: 100 MΩ min. at 500 V DC.
 DIELECTRIC STRENGTH: 500 V AC min.
 OPERATING/STORAGE TEMPERATURES: -10°C to 60°C.
 PACKAGING: Switches are supplied in anti-static bags
 or anti-static trays.

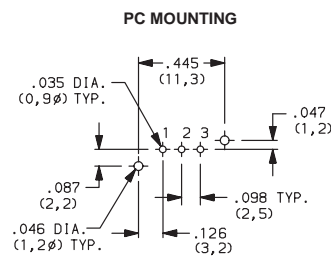
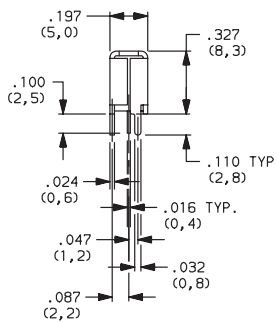
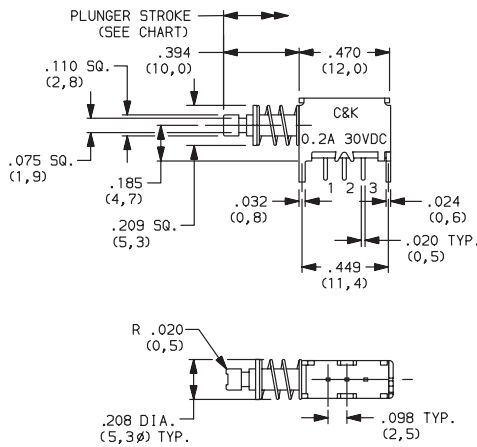
NOTE: All models are RoHS compliant and compatible.

Materials

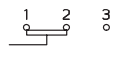
FRAME: Tin plated steel.
 ACTUATOR: Polyacetal. Color: Manufacturing option.
 BASE: Laminated phenolic.
 TERMINALS: Silver plated brass.
 MOVABLE CONTACTS: Silver plated (or clad) phosphor bronze.
 RETURN SPRING: Music wire.
 DETENT SPRING: Phosphor bronze.
 DETENT SPRING PLATE: Phosphor bronze.
 RETURN SPRING RETAINER RING: Nickel (or tin) plated steel.
 TERMINAL SEAL: Epoxy.

How To Order

Complete part numbers for PN Series Alternate & Momentary Action Pushbutton Switches are shown on pages A-82 thru A-83.



PN11SBSA03QE
SPDT

PART NUMBER	SWITCH FUNCTION	OPERATING FORCE (typ.)	STROKE		SHORTING/ NON-SHORTING	SCHEMATIC
			LOCK STROKE	FULL STROKE		
PN11SBNA03QE	SPDT Momentary	120g max.	—	.140 (3,5)	Non-Shorting	
PN11SCNA03QE	SPDT Momentary	150g	—			
PN11SHNA03QE	SPDT Momentary	230g	—			
PN11SJNA03QE	SPDT Momentary	330g	—			
PN12SHNA03QE	SPDT Locking	230g	.100g (2,5)			
PN12SJNA03QE	SPDT Locking	330g	.100g (2,5)	.140 (3,5)	Shorting	
PN11SBSA03QE	SPDT Momentary	120g max.	—			
PN11SCSA03QE	SPDT Momentary	150g	—			
PN11SHSA03QE	SPDT Momentary	230g	—			
PN11SJSA03QE	SPDT Momentary	330g	—			
PN12SHSA03QE	SPDT Locking	230g	.100g (2,5)			
PN12SJSA03QE	SPDT Locking	330g	.100 (2,5)			



Dimensions are shown: Inches (mm)
 Specifications and dimensions subject to change





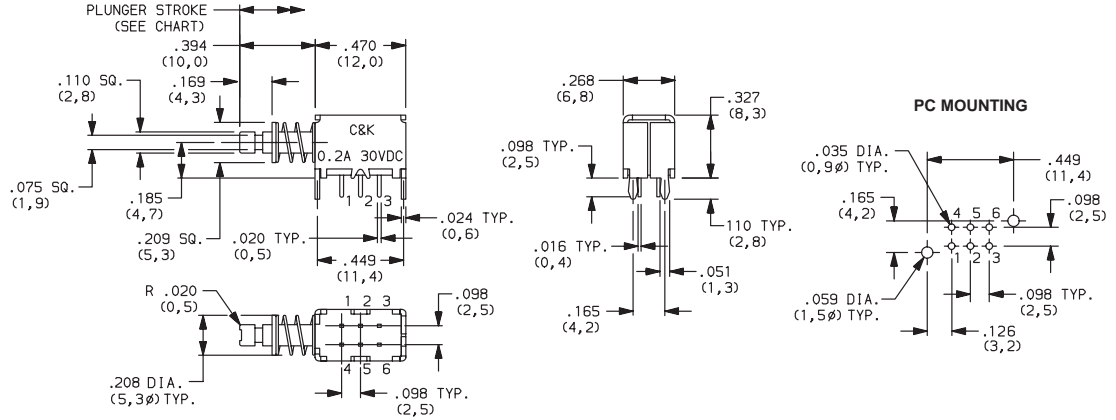
PN Series Alternate & Momentary Action Pushbutton Switches

A

Pushbutton



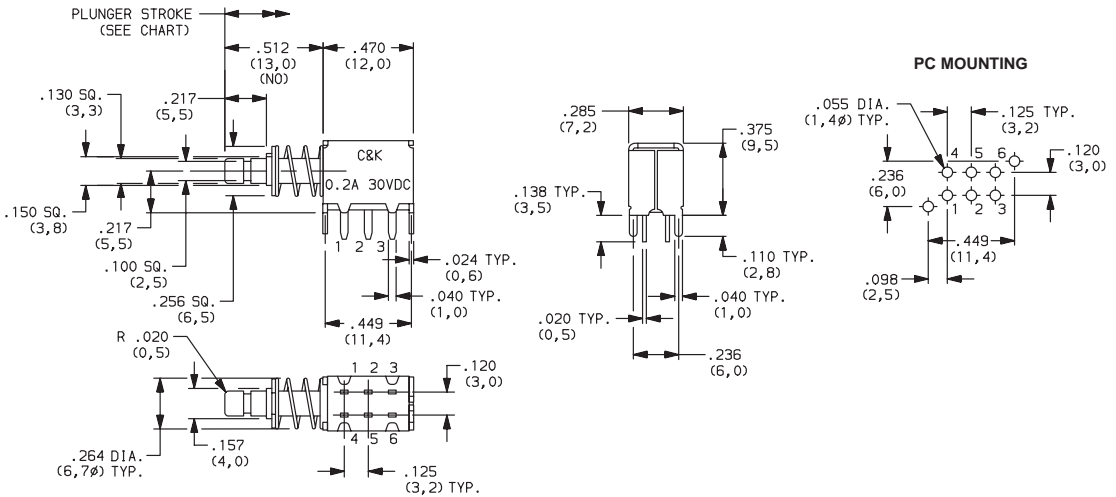
PN21SBSA03QE
DPDT



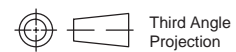
PART NUMBER	SWITCH FUNCTION	OPERATING FORCE (typ.)	STROKE		SHORTING/ NON-SHORTING	SCHEMATIC
			LOCK STROKE	FULL STROKE		
PN21SBNA03QE	DPDT Momentary	120g max.	—	.140 (3,5)	Non-Shorting	
PN21SDNA03QE	DPDT Momentary	175g	—			
PN21SJNA03QE	DPDT Momentary	330g	—			
PN22SJNA03QE	DPDT Locking	330g	.100 (2,5)	.140 (3,5)	Shorting	
PN21SBSA03QE	DPDT Momentary	120g max.	—			
PN21SDSA03QE	DPDT Momentary	175g	—			
PN21SJSA03QE	DPDT Momentary	330g	—	.100 (2,5)		
PN22SJSA03QE	DPDT Locking	330g	.100 (2,5)			



PN21LASA03QE
DPDT



PART NUMBER	SWITCH FUNCTION	OPERATING FORCE (typ.)	STROKE		SHORTING/ NON-SHORTING	SCHEMATIC
			LOCK STROKE	FULL STROKE		
PN21LANA03QE	DPDT Momentary	100g max.	—	.140 (3,5)	Non-Shorting	
PN21LFNA03QE	DPDT Momentary	120g	—			
PN21LDNA03QE	DPDT Momentary	175g	—			
PN21LENA03QE	DPDT Momentary	300g	—	.140 (3,5)	Shorting	
PN22LENA03QE	DPDT Locking	300g	.100 (2,5)			
PN21LASA03QE	DPDT Momentary	100g max.	—			
PN21LFSA03QE	DPDT Momentary	120g	—	.100 (2,5)		
PN21LDSA03QE	DPDT Momentary	175g	—			
PN21LESA03QE	DPDT Momentary	300g	—			
PN22LESA03QE	DPDT Locking	300g	.100 (2,5)			



Third Angle
Projection



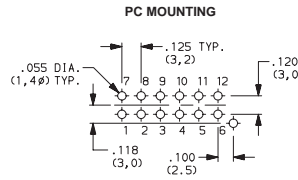
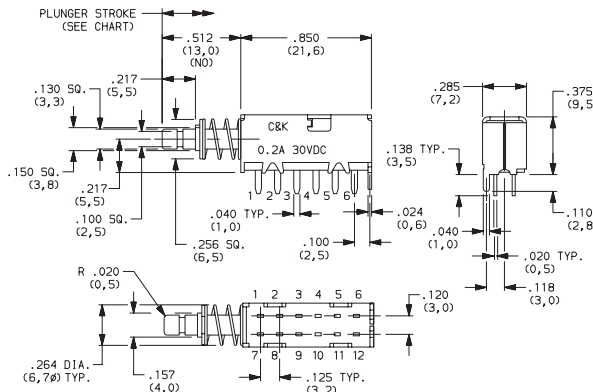
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

PN Series Alternate & Momentary Action Pushbutton Switches



A

Pushbutton

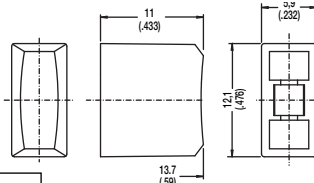


PN41LGS A02QE
4PDT

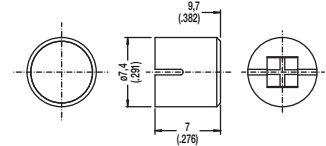
PART NUMBER	SWITCH FUNCTION	OPERATING FORCE (typ.)	STROKE		SHORTING/ NON-SHORTING	SCHEMATIC
			LOCK STROKE	FULL STROKE		
PN41LGNA02QE	4PDT Momentary	175g	—	.140 (3,5)	Non-Shorting	
PN41LENA02QE	4PDT Momentary	300g	—			
PN42LENA02QE	4PDT Locking	300g	.100 (2,5)	.140 (3,5)	Shorting	
PN41LGS A02QE	4PDT Momentary	175g	—			
PN41LESA02QE	4PDT Momentary	300g	—	.140 (3,5)	Shorting	
PN42LESA02QE	4PDT Locking	300g	.100 (2,5)			

BUTTONS MUST BE ORDERED SEPARATELY. SHIPPED IN BULK.

PE



PV

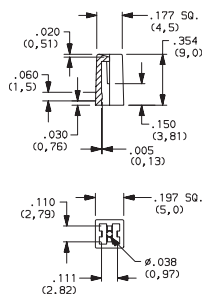


OPTION CODE	COLOR
RD	Red
GY	Gray
BK	Black
WH	White

PE and PV buttons fit .130" square plungers

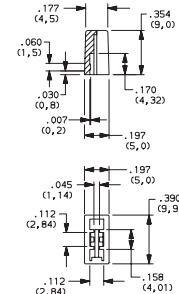
Indexed

- G001A Black
- G001G Gray
- G001I Ivory
- G001R Red



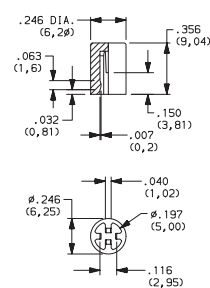
Rectangular

- G002A Black
- G002G Gray
- G002I Ivory
- G002R Red



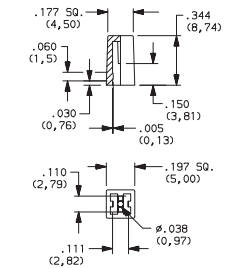
Round

- G003A Black
- G003G Gray
- G003I Ivory
- G003R Red

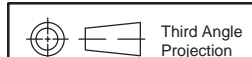


Square

- G004A Black
- G004G Gray
- G004I Ivory
- G004R Red



G001, G002, G003 and G004 buttons fit .110" square plungers.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





PHA Series Short Stroke Pushbutton Switches



Features/Benefits

- **Momentary or latching action**
- **Low cost, reliable contact design**
- **2, 4 & 6 pole configurations**
- **Sealed contacts**
- **Optional buttons**
- **RoHS compliant**

Typical Applications

- **Computers and peripherals**
- **Instrumentation and measurement equipment**
- **Non-power, on-off switch applications**

Specifications

SWITCHING POWER MAX.: 3 W DC
 SWITCHING VOLTAGE MAX.: 30 V DC
 SWITCHING CURRENT MAX.: 100 mA DC
 DIELECTRIC STRENGTH (50 Hz/1 min.): 500 V between open contacts. 1500 V between chassis and contacts.
 OPERATING LIFE: Impulse/momentary (OA): $\wedge 10^4$ operations.
 Latching (EE): $\wedge 10^4$ operations
 CONTACT RESISTANCE: New: %20 m Ω
 After 105 operations: %40 m Ω
 INSULATION RESISTANCE: $\wedge 10^{10}\Omega$
 CAPACITANCE: %1.5 pF
 CONTACT BOUNCE: %2 ms
 Operating speed 200 mm/s (7.87 inch/s)
 TOTAL TRAVEL/LATCHING TRAVEL: 2.5mm/1.5mm
 (.0984 inch/.0591 inch)
 OPERATING FORCE:
 2U: 170cN \pm 50cN (170 grams \pm 50 grams)
 4U: 230cN \pm 70cN (230 grams \pm 70 grams)
 6U: 300cN \pm 100cN (300 grams \pm 100 grams)
 SEALING: Sealed contacts.

Materials

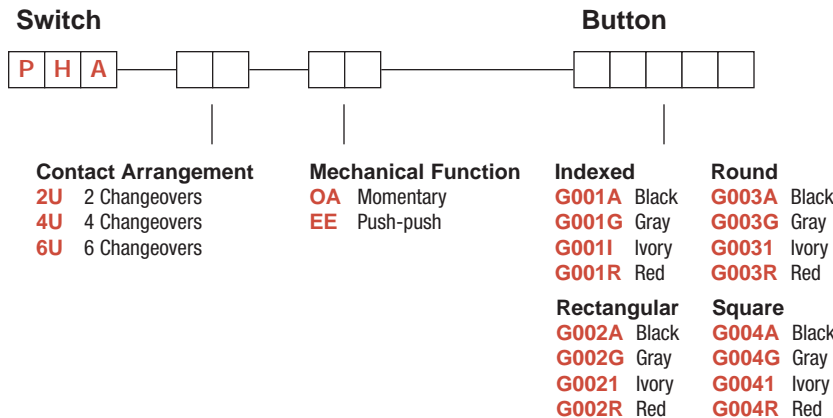
FIXED TERMINAL: Brass, silver plated.
 MOVABLE CONTACT: Phosphor bronze, silver plated.
 SWITCH BODY: PPE
 ACTUATOR: POM
 STANDOFF CLIP: POM
 RETURN SPRING: Music wire.
 RETURN SPRING RETAINER: Carbon steel, tin plated.
 DETENT SPRING PLATE: Phosphor bronze.
 DETENT SPRING: Stainless steel.
 BASE: Laminated phenolic.
 TERMINAL SEAL: Epoxy.

NOTE: All models are RoHS compliant and compatible.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-85 thru A-87. For additional options not shown in catalog, consult Customer Service Center.



BUTTON REMOVAL

A button of a push-push switch should only be removed in the "OFF" non-latching position.

PHA Series Short Stroke Pushbutton Switches

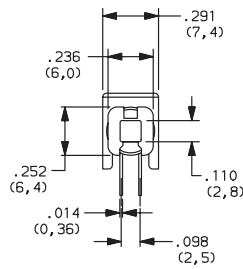
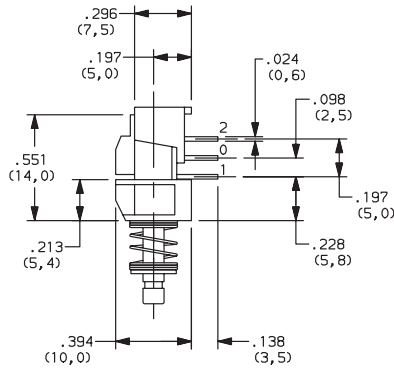
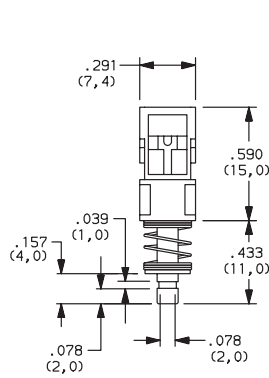


A

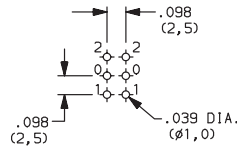
Pushbutton

DESIGNATION

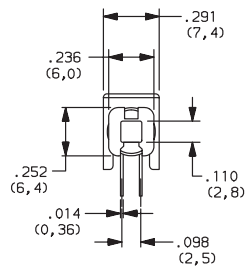
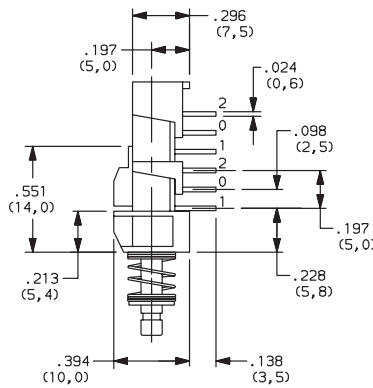
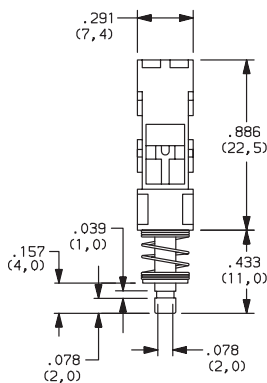
2U 2 CHANGEOVERS



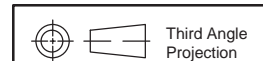
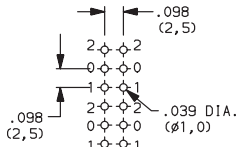
PC MOUNTING



4U 4 CHANGEOVERS



PC MOUNTING



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

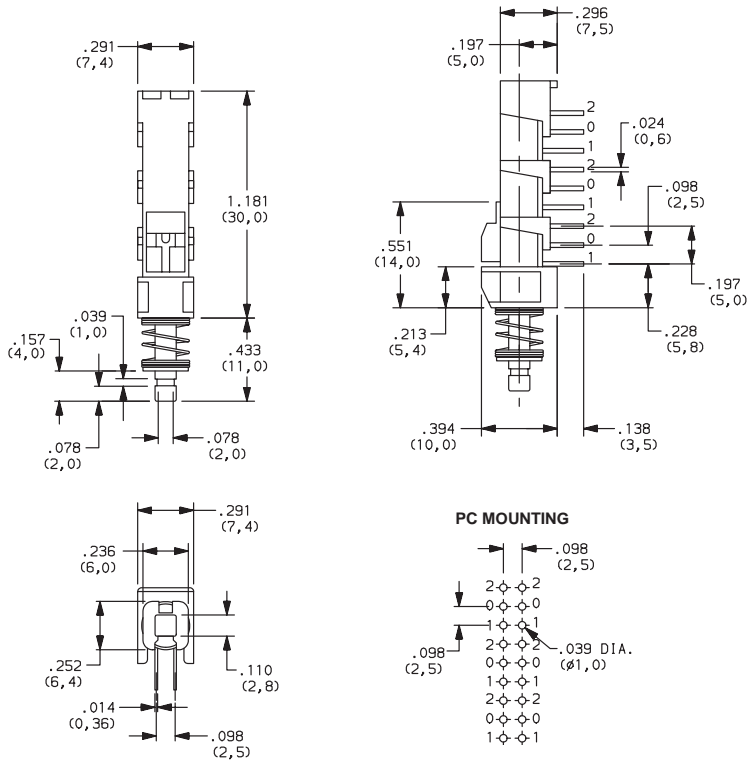


PHA Series Short Stroke Pushbutton Switches

DESIGNATION

Pushbutton

6U 6 CHANGEOVERS



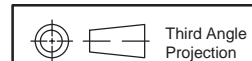
CONTACT ARRANGEMENT

OPTION CODE	NO. OF POLES *	SCHEMATIC
2U	2PDT	
4U	4PDT	2X
6U	6PDT	3X

*Non-shorting contacts.

MECHANICAL FUNCTION

OPTION CODE	FUNCTION
OA	Momentary
EE	Push-push



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

PHA Series Short Stroke Pushbutton Switches



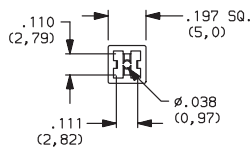
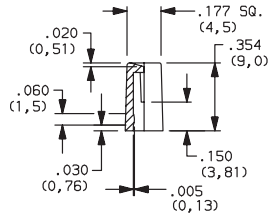
A

Pushbutton

BUTTONS

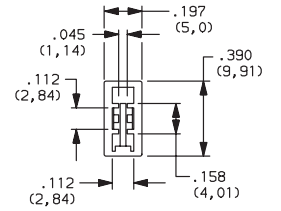
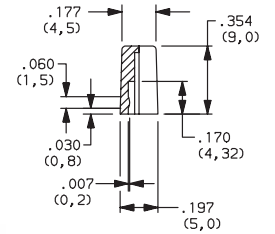
Indexed

- G001A** Black
- G001G** Gray
- G001I** Ivory
- G001R** Red



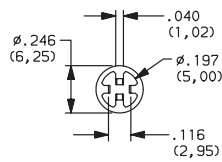
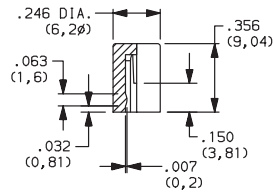
Rectangular

- G002A** Black
- G002G** Gray
- G002I** Ivory
- G002R** Red



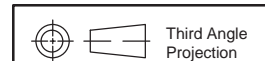
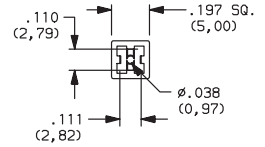
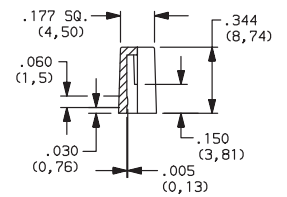
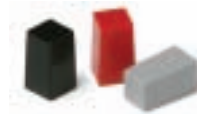
Round

- G003A** Black
- G003G** Gray
- G003I** Ivory
- G003R** Red



Square

- G004A** Black
- G004G** Gray
- G004I** Ivory
- G004R** Red



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



F Series Pushbutton Switches

Features/Benefits

- Up to 10 poles per module
- Various contact terminals
- Various mounting & switch ganging configurations
- Mechanical indicator buttons
- Illumination options
- RoHS compliant

Typical Applications

- Audio selection
- Digital equipment interface
- Medical equipment interface



Specifications

SWITCHING POWER: F module max. AC/DC: Silver: 50 VA/15W, Gold: 1 VA/300 mW.

SWITCHING VOLTAGE: F module max. AC/DC: Silver: 125/30V, Gold: 50/30 V.

SWITCHING CURRENT: F module max. AC/DC: Silver: 0.5A/0.5A, Gold: 0.04A/0.01A.

CARRYING CURRENT: Max at \dot{u} = 20C: Silver: < 2A, Gold: <0.5A.

DIELECTRIC STRENGTH (50 Hz, 1 min.): Chassis/contact: \wedge 1500V Between contacts: \wedge 1500V.

OPERATING LIFE "OA/EE" (24V/200mA): $>10^5$ operations "GR": $>3.5 \times 10^4$ operations.

CONTACT RESISTANCE: Initial: Typical %10 m Ω , max. 20 m Ω After operating life: %100 m Ω

INSULATION RESISTANCE: \wedge 10⁹ Ω between open contacts, \wedge 10⁹ Ω between chassis and contacts.

CAPACITANCE (at f = 10 kHz): %0.7 pF between 2 contacts.

TOTAL TRAVEL/LATCHING TRAVEL: 4.7mm/3.3mm (.185 inch/.130 inch).

All models and options are RoHS compliant and compatible.

NOTE: All models and options are RoHS compliant and compatible.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

TYPICAL F OPERATING FORCE: 2U: 6.5N (650 grams); 4U: 6.5N (650 grams); 6U: 7.5N (750 grams); 8U: 9.0N (900 grams); 10U: 9.0N (900 grams).

EUROPEAN TYPICAL SF OPERATING FORCE:
2U: 3.5N \pm 0.5N (350 grams \pm 100 grams); 4U: 5N \pm 1N (500 grams \pm 100 grams); 6U: 6.5N \pm 1N (650 grams \pm 100 grams); 8U: 9.0N \pm 1N (900 grams \pm 100 grams).

OPERATING TEMPERATURE RANGE: -40°C to 70°C.

Materials

HOUSING: Polycarbonate UL 94V-0 or polyester UL 94V-0.

ACTUATOR: Polyester UL 94V-0.

MOVABLE CONTACTS: Bimetal brass, silver plated, gold plate over nickel.

STATIONARY CONTACTS & TERMINALS: Brass, silver plated, gold plated.

TERMINAL BOARD: Polyester UL 94V-0.

RETURN SPRING: Music wire.

TERMINAL SEAL: RTV adhesive sealant.

CHASSIS: Steel.

LOCKOUT PIN: Steel.

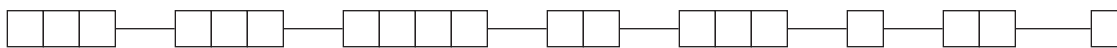
BLOCKERS: Steel.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-92 thru A-100. For additional options not shown in catalog, consult Customer Service Center.

If requesting only a switch, select either a North American or European switch as noted below. Chassis and buttons are sold separately. If multiple stations are selected, we will assume all switches are the same unless noted otherwise.

North American Order Code - Switch Only



Designation

- F** F Series
- FLT** Light touch F series
- ZF** Central mounted F series

Contact Arrangement

- 2U** 2PDT
- 4U** 4PDT
- 6U** 6PDT
- 8U** SPDT
- 10U** 10PDT

Mechanical Function

- OA** Momentary
- EE** Alternate (push-push)
- GR** Interlock
- AOR** Central release
- OASP** Momentary with lockout
- GRSP** Interlock with lockout

Terminal Sealing

- (NONE)** None
- TB** Top/bottom

Terminal Style

- (NONE)** Solder lugs & PC pins
- 01A** Cut solder lugs
- 01B** Cut PC pins, for other configurations, consult factory

Electrical Function

- (NONE)** BBM
- M** MBB (special)

Contact Material

- (NONE)** Silver, AG
- AU** Gold

Dress nut*

*Central mounted F series only

- (NONE)** No dress nut
- B** Black
- C** Chrome



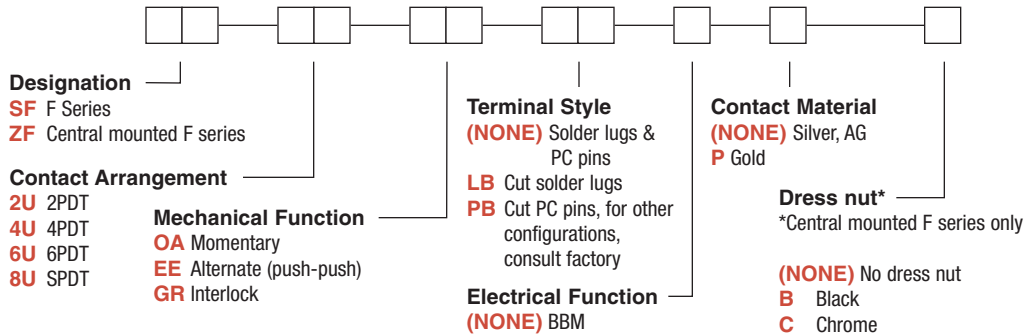
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

F Series Pushbutton Switches



A
Pushbutton

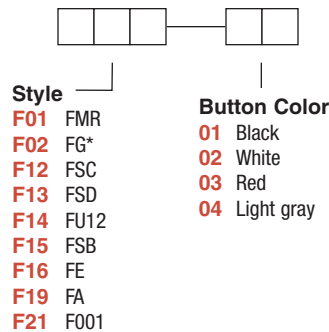
European Order Code - Switch Only



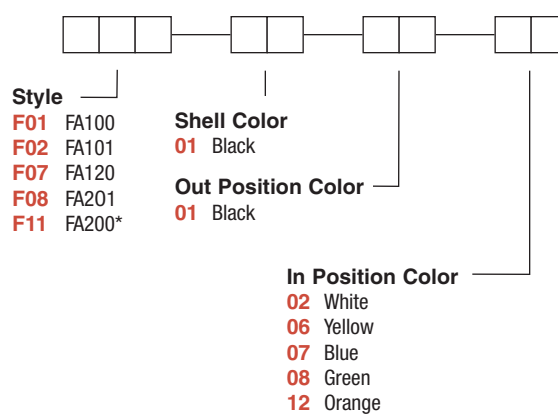
*Minimum order quantities apply.

Order Code - Buttons

Solid Buttons



Mechanical Indicator Buttons



*Button options for central mounting configurations, use 'FG' for central mount with chrome dress nut, use 'FA200' for central mount with black dress nut.

BUTTON REMOVAL

A button of a push-push switch should only be removed in the "OFF" non-latching position.

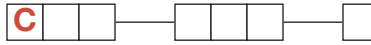


F Series Pushbutton Switches

Order Code - Chassis

To order a switch with chassis, create the switch part number listed above and add the Chassis part number configurator information at the end of the part number.

Note: We do not guarantee or recommend interlocking beyond 10 stations.



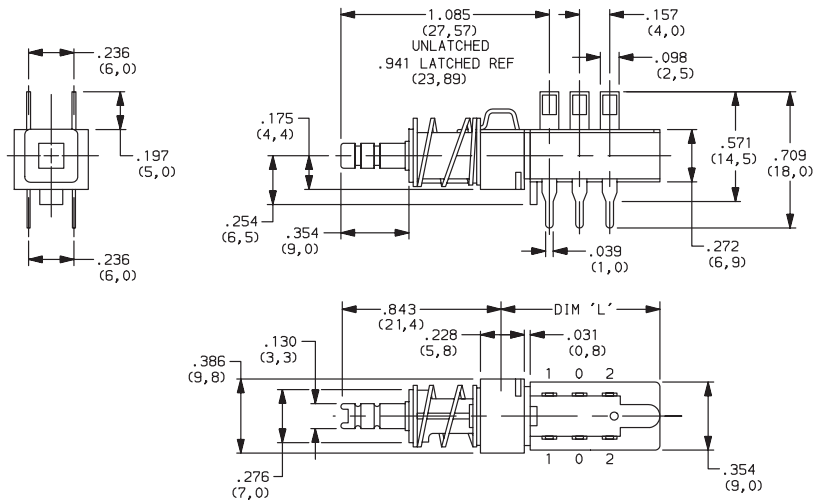
<p>No. of Stations</p> <p>01 thru 23 Comes with standard .094 (2,4mm) mounting holes Note: Single station chassis available with special mounting configurations, consult factory.</p>	<p>Spacing between Stations</p> <p>00 Single station 10 10mm 12.5 12.5mm 15 15mm 17.5 17.5mm 20 20mm</p>	<p>Special Acknowledgements</p> <p>See note</p>
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*Minimum order quantities apply.

SWITCHES WITH STANDARD OPTIONS

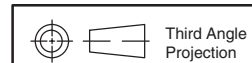
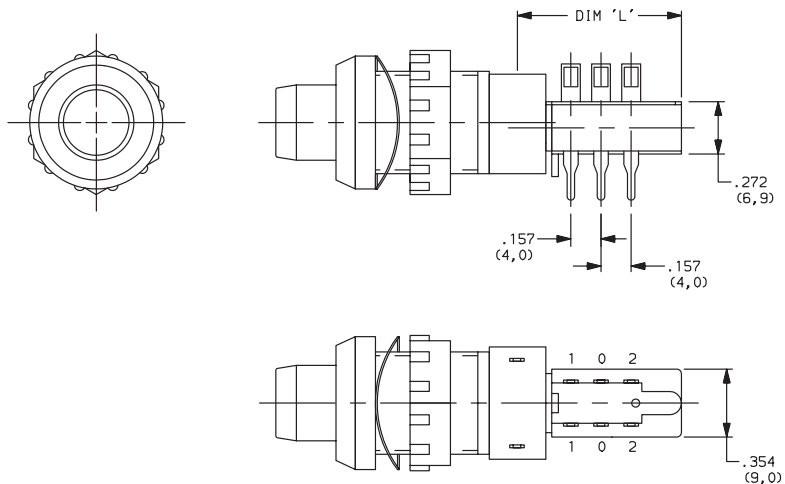
F2UEE

CONTACT ARRANGEMENT	LENGTH DIM 'L'
2U	0.827 (21,00)
4U	1.300 (33,00)
6U	1.770 (45,00)
8U	2.240 (57,00)
10U	2.720 (69,00)



ZF2UEEBF11010108

CONTACT ARRANGEMENT	LENGTH DIM 'L'
2U	0.827 (21,00)
4U	1.300 (33,00)
6U	1.770 (45,00)
8U	2.240 (57,00)
10U	2.720 (69,00)



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



F Series Pushbutton Switches



A

Pushbutton

DESIGNATION



Designation, North America

- F** F Series
- FLT** Light touch F series
- ZF** Central mounted F series

Designation, Europe

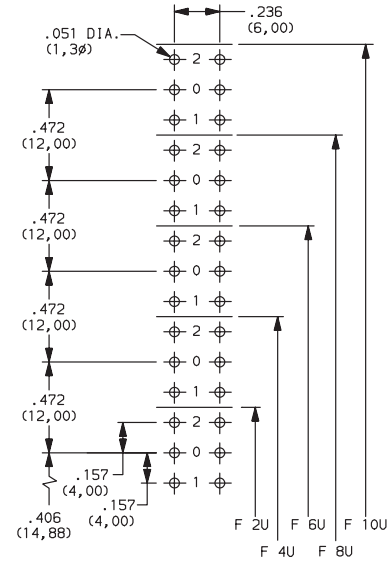
- SF** F Series
- ZF** Central mounted F series

CONTACT ARRANGEMENT



OPTION CODE	NO. OF POLES	SCHEMATIC
2U	2PDT	
4U	4PDT	2X
6U	6PDT	3X
8U	8PDT	4X
10U	10PDT	5X

PC MOUNTING



MECHANICAL FUNCTION



North America

OPTION CODE	FUNCTION
OA	Momentary
EE	Alternate (push-push)
GR	Interlock
AOR	Central release
OASP	Momentary with lockout
GRSP	Interlock with lockout

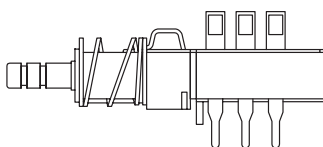
Europe

OPTION CODE	FUNCTION
OA	Momentary
EE	Alternate (push-push)
GR	Interlock

TERMINAL SEALING

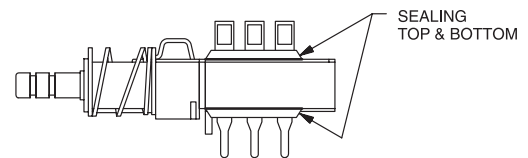


(NONE) NO SEAL



F2UEE shown in example above.

TB TOP & BOTTOM



NOTE: Available for North America only



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change



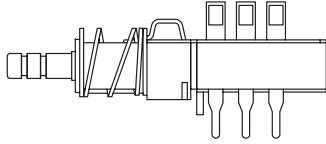


F Series Pushbutton Switches

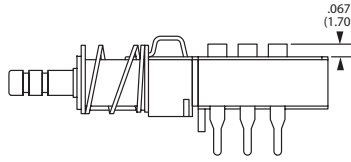
Pushbutton
A

TERMINAL STYLE

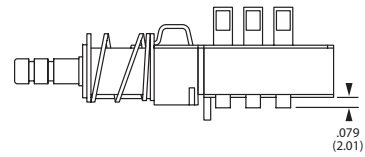
(NONE) SOLDER LUGS & PC PINS



01A CUT SOLDER LUGS (North America)
LB CUT SOLDER LUGS (Europe)



01B CUT PC PINS (North America)
PB CUT PC PINS (Europe)



ELECTRICAL FUNCTION

OPTION CODE	FUNCTION
(NONE)	BBM Non-shorting
M	MBB Shorting (North America only)

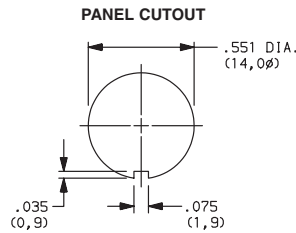
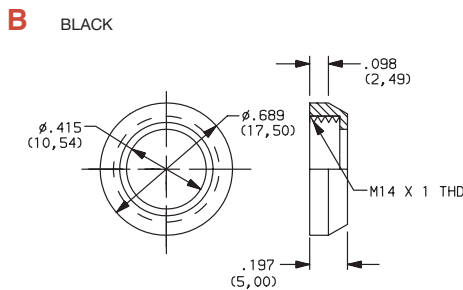
CONTACT MATERIAL

NORTH AMERICA OPTION CODE	EUROPE OPTION CODE	RoHS COMPLIANT *	RoHS COMPATIBLE *	MATERIAL	RATING
(NONE)	(NONE)	YES	YES	SILVER, AG	50 VA/15 W; 125/30 V; 0.5/0.5 A
AU	P	YES	YES	GOLD	1 VA/300mW; 50/30 V; 0.04 A/0.01 A

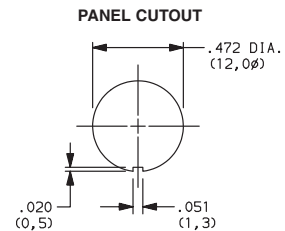
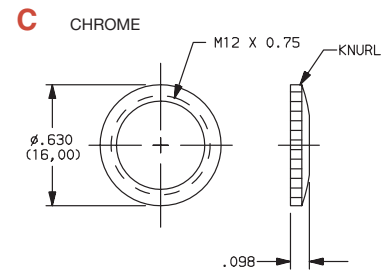
* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

DRESS NUT

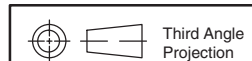
(NONE) NO DRESS NUT FOR F & F/LT DESIGNATIONS



NOTE: Available with ZF designation and FA200 buttons.



NOTE: Available with ZF designation and FG button.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

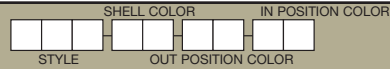


F Series Pushbutton Switches



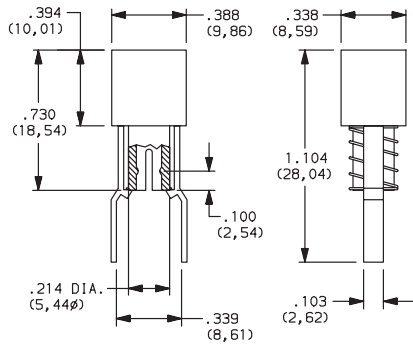
A Pushbutton

MECHANICAL BUTTON

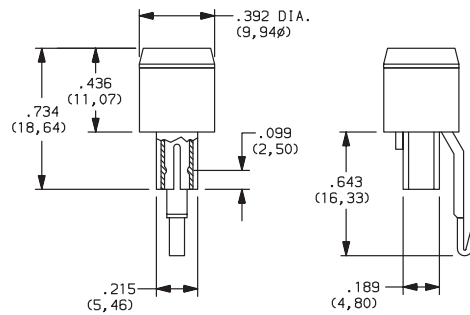


STYLE

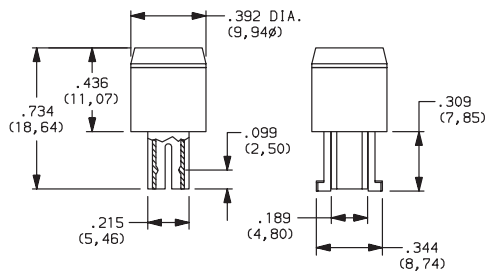
F07 FA120



F08 FA201



F11 FA200



SHELL COLOR

01 BLACK

OUT POSITION COLOR

01 BLACK

IN POSITION COLOR

OPTION CODE	COLOR
02	WHITE
06	YELLOW
07	BLUE
08	GREEN
12	ORANGE

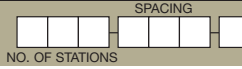


Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



F Series Pushbutton Switches

CHASSIS



Pushbutton
A

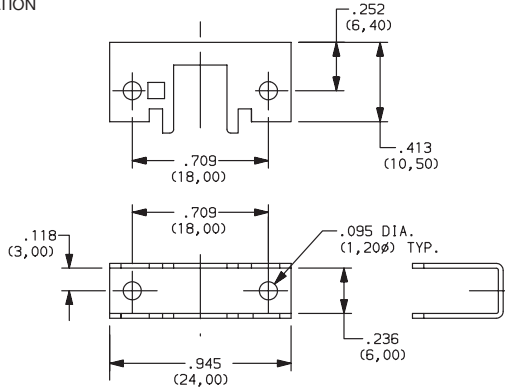
NUMBER OF STATIONS

C00 Thru C10 Comes with standard 0.094 (2,44mm) mounting holes

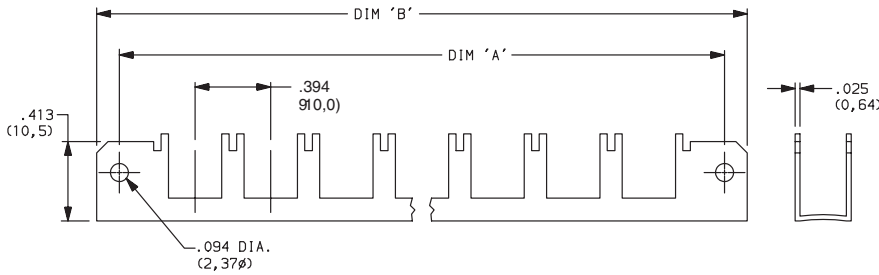
NOTE: Single station chassis available with mounting configurations, consult factory.

SPACING

00 SINGLE STATION

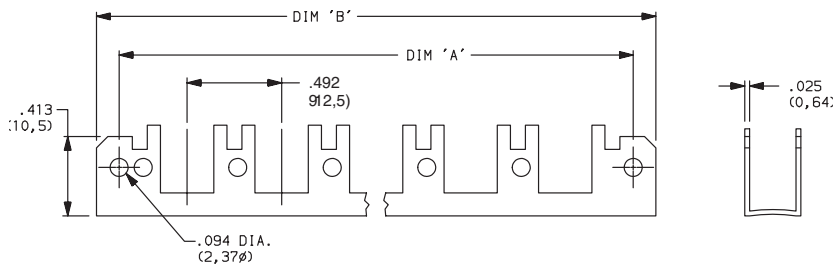


10 10mm



No. of Stations	Dim. 'A'	Dim. 'B'	Tolerance
2	1.182 (30,02)	1.418 (36,02)	0.005
3	1.575 (40,01)	1.811 (46,00)	0.010
4	1.969 (50,01)	2.205 (56,01)	0.010
5	2.363 (60,02)	2.599 (66,01)	0.010
6	2.757 (70,03)	2.993 (76,02)	0.015
7	3.150 (80,01)	3.386 (86,00)	0.015
8	3.544 (90,02)	3.780 (96,01)	0.015
9	3.938 (100,03)	4.174 (106,02)	0.015
10	4.331 (110,01)	4.567 (116,00)	0.015

12.5 12.5mm



No. of Stations	Dim. 'A'	Dim. 'B'	Tolerance
2	1.200 (30,48)	1.436 (36,47)	0.005
3	1.692 (42,98)	1.928 (48,97)	0.010
4	2.184 (55,47)	2.420 (61,47)	0.010
5	2.676 (67,97)	2.912 (73,96)	0.010
6	3.169 (80,49)	3.405 (86,49)	0.015
7	3.661 (92,99)	3.897 (98,98)	0.015
8	4.153 (105,49)	4.389 (111,48)	0.015
9	4.645 (117,98)	4.881 (123,98)	0.015
10	5.137 (130,48)	5.373 (136,47)	0.015



Third Angle Projection

Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



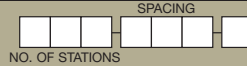
F Series Pushbutton Switches



A

Pushbutton

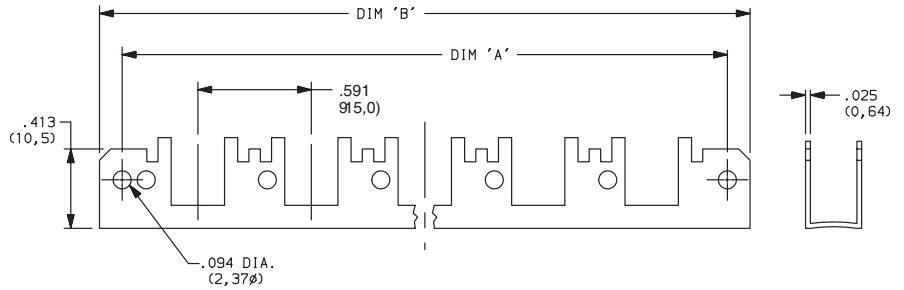
CHASSIS



SPACING

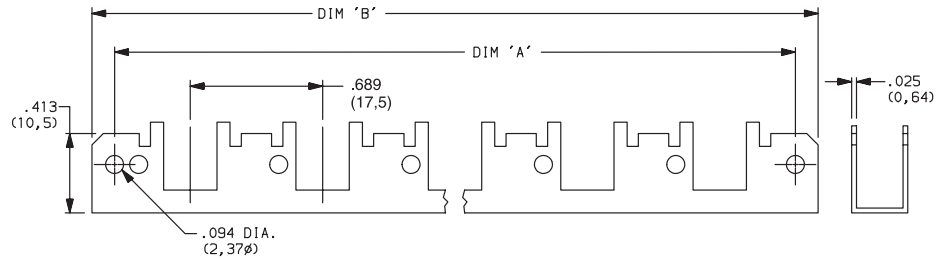
15 15mm

No. of Stations	Dim. 'A'	Dim. 'B'	Tolerance
2	1.374 (34,90)	1.615 (41,02)	0.005
3	1.969 (50,01)	2.205 (56,01)	0.010
4	2.560 (65,02)	2.796 (71,02)	0.010
5	3.150 (80,01)	3.386 (86,00)	0.010
6	3.741 (95,02)	3.977 (101,02)	0.015
7	4.332 (110,03)	4.568 (116,03)	0.015
8	4.922 (125,02)	5.158 (131,01)	0.015
9	5.513 (140,03)	5.749 (146,02)	0.015
10	6.103 (155,02)	6.339 (161,01)	0.015



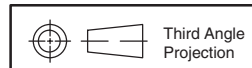
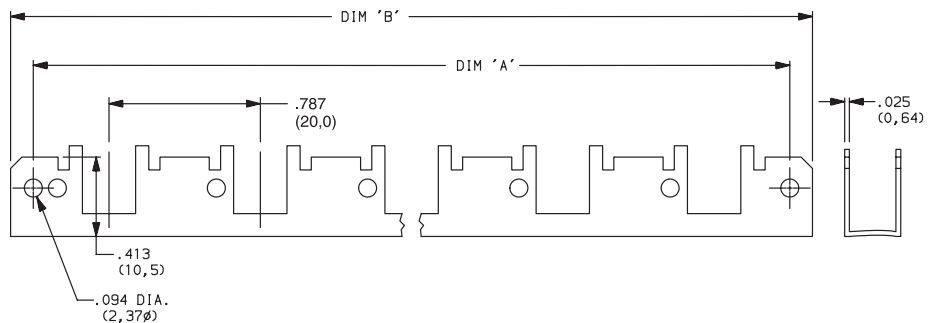
17.5 17.5mm

No. of Stations	Dim. 'A'	Dim. 'B'	Tolerance
2	1.477 (37,52)	1.713 (43,51)	0.005
3	2.166 (55,02)	2.402 (61,01)	0.010
4	2.855 (75,52)	3.091 (78,51)	0.010
5	3.544 (90,02)	3.780 (96,01)	0.010
6	4.233 (107,52)	4.469 (113,51)	0.015
7	4.922 (125,02)	5.158 (131,01)	0.015
8	5.611 (142,52)	5.847 (148,51)	0.015
9	6.300 (160,02)	6.536 (166,01)	0.015
10	6.989 (177,52)	7.225 (183,52)	0.015



20 20mm

No. of Stations	Dim. 'A'	Dim. 'B'	Tolerance
2	1.575 (40,01)	1.811 (46,00)	0.005
3	2.363 (60,02)	2.599 (66,01)	0.010
4	3.150 (80,01)	3.386 (86,00)	0.010
5	3.938 (100,03)	4.174 (106,02)	0.010
6	4.725 (120,02)	4.961 (126,01)	0.015
7	5.512 (140,00)	5.748 (146,00)	0.015
8	6.300 (160,02)	6.536 (166,01)	0.015
9	7.087 (180,01)	7.323 (186,00)	0.015
10	7.875 (200,03)	8.111 (206,02)	0.015



Third Angle Projection
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change





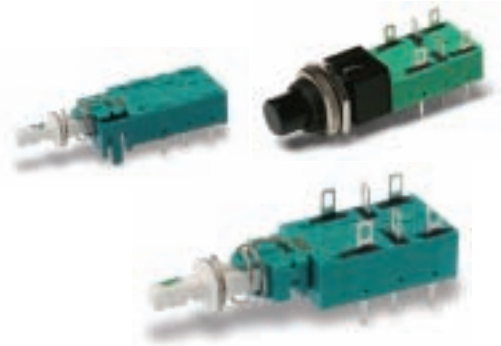
NE-18 Series Mains / Power Switches

Features/Benefits

- Chassis or panel mount
- Various buttons
- Various contact configurations
- RoHS compliant

Typical Applications

- Mains/power switching
- Consumer electronics
- Audio equipment
- Digital products



Specifications

POWER CONTACT:

SWITCHING POWER MAX. AC/DC: NE18: 1500/100 W,
NE18CTII: 1000/100 W; AC (Inductive $\cos \phi = 0.6$): NE18: 900W,
NE18CTII: 600W.

SWITCHING VOLTAGE MAX. AC/DC: 250/100V

SWITCHING CURRENT MAX. AC/DC

AC (Inductive $\cos \phi = 0.6$): NE18: $6 A^2$ /1 A, NE18CTII: $4 A^2$ /1 A

INRUSH CURRENT MAX. AC¹): NE18: 36 A, NE18CTII: 64 A

DIELECTRIC STRENGTH (50 Hz, 1 min.): 2000 V

OPERATING LIFE AT MAX. LOAD AND AT MAX. INRUSH
CURRENT: $\sim 10^4$ operations⁵)

CONTACT RESISTANCE: Initial: 50m Ω ; After 10^4 operations: 70m Ω .

INSULATION RESISTANCE: $\sim 10^{12} \Omega$ chassis – nearest contact;
 $\sim 10^{12} \Omega$ mains contact – mains contact; $\sim 10^{12} \Omega$ mains contact –
mains contact after 10^4 operations.

LOW VOLTAGE CONTACT:

SWITCHING POWER MAX.: 12W

SWITCHING VOLTAGE MAX.: 24V

SWITCHING CURRENT MAX.: 0.5A

TOTAL TRAVEL: 4.7mm (.185 inch)

LATCHING TRAVEL: 3.3mm (.130 inch)

OPERATING FORCE: Without auxiliary low voltage contacts:

NE18: 7N (700 grams); NE18CTII: 9.5N (950 grams).

With auxiliary low voltage contacts: NE18: 8N (800 grams);

NE18CTII: 11N (1100 grams).

SEALING: Dust proof.

Materials

HOUSING, ACTUATOR & TERMINAL BOARD: Thermoplastic polyester (UL 94V-0).

MOVABLE CONTACT: Silver nickel alloy, silver plated.

FIXED CONTACTS: Silver nickel alloy, silver plated.

COMMON CONTACTS & TERMINALS: Copper alloy, silver plated.

RETURN SPRING: Music wire.

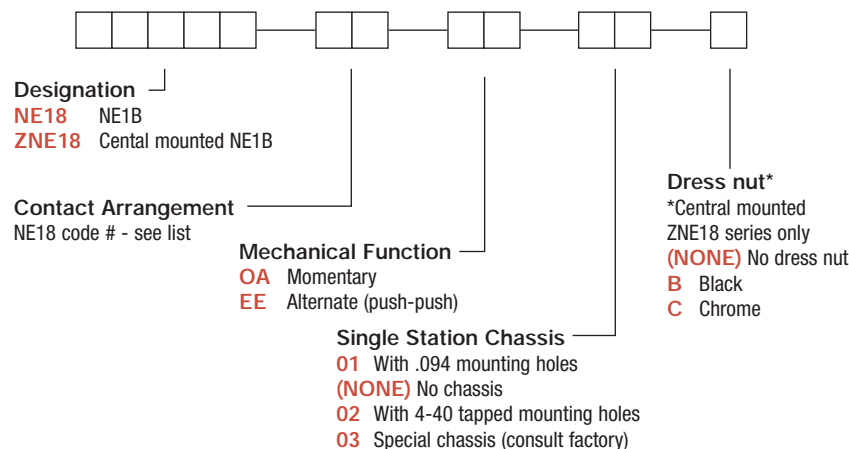
NOTE: All models are RoHS compliant and compatible.

NOTE: Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-102 thru A-109. For additional options not shown in catalog, consult Customer Service Center.

If requesting only a switch, select the switch as noted below. Buttons are sold separately.



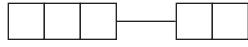
NE-18 Series Mains / Power Switches



A
Pushbutton

Order Code - Buttons

Solid Buttons



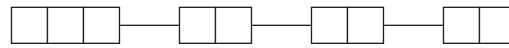
Style

F01 FMR
F02 FG*
F12 FSC
F13 FSD
F14 FU12
F15 FSB
F16 FE
F19 FA
F21 F001

Button Color

01 Black
02 White
03 Red
04 Light gray

Mechanical Indicator Buttons



Style

F01 FA100
F02 FA101
F07 FA120
F08 FA201
F11 FA200*

Shell Color

01 Black

Out Position Color

01 Black

In Position Color

02 White
06 Yellow
07 Blue
08 Green
12 Orange

*Button options for central mounting configurations, use 'FG' for central mount with chrome dress nut, use 'FA200' for central mount with black dress nut.

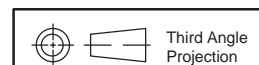
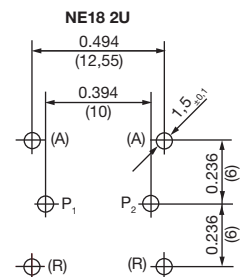
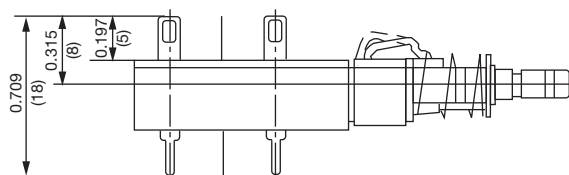
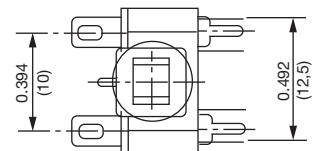
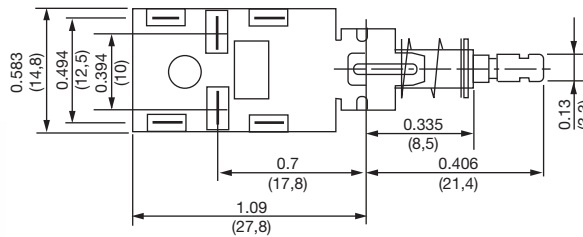
BUTTON REMOVAL

A button of a push-push switch should only be removed in the "OFF" non-latching position.

DESIGNATION & SWITCHES WITH STANDARD OPTIONS



NE1838EE



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



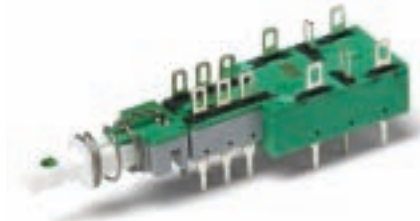
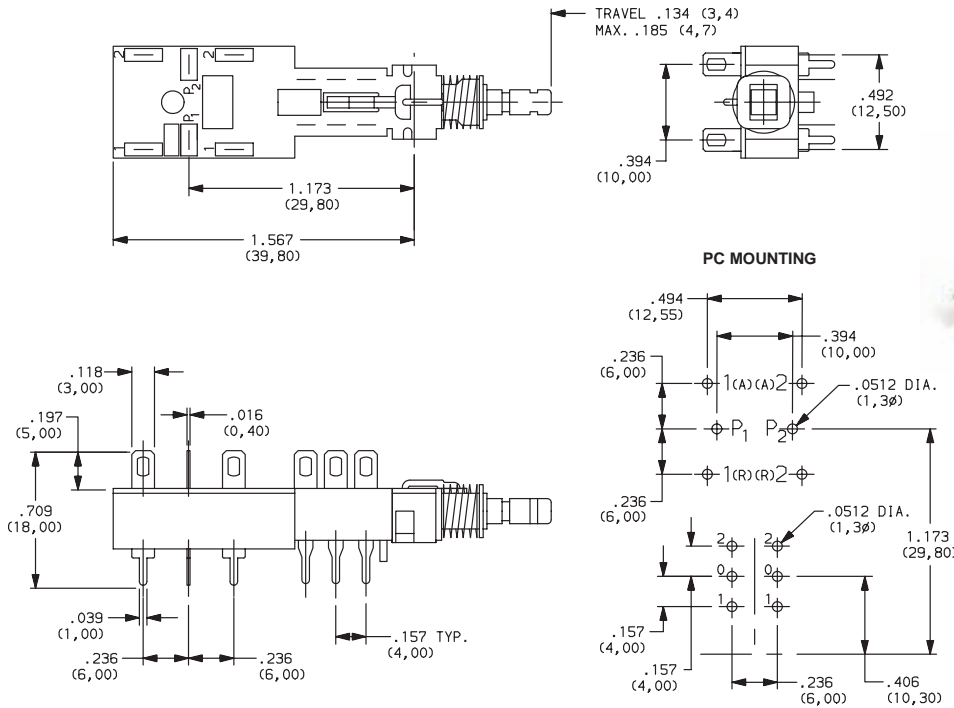
Pushbutton
A

NE-18 Series Mains / Power Switches

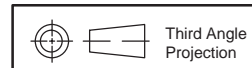
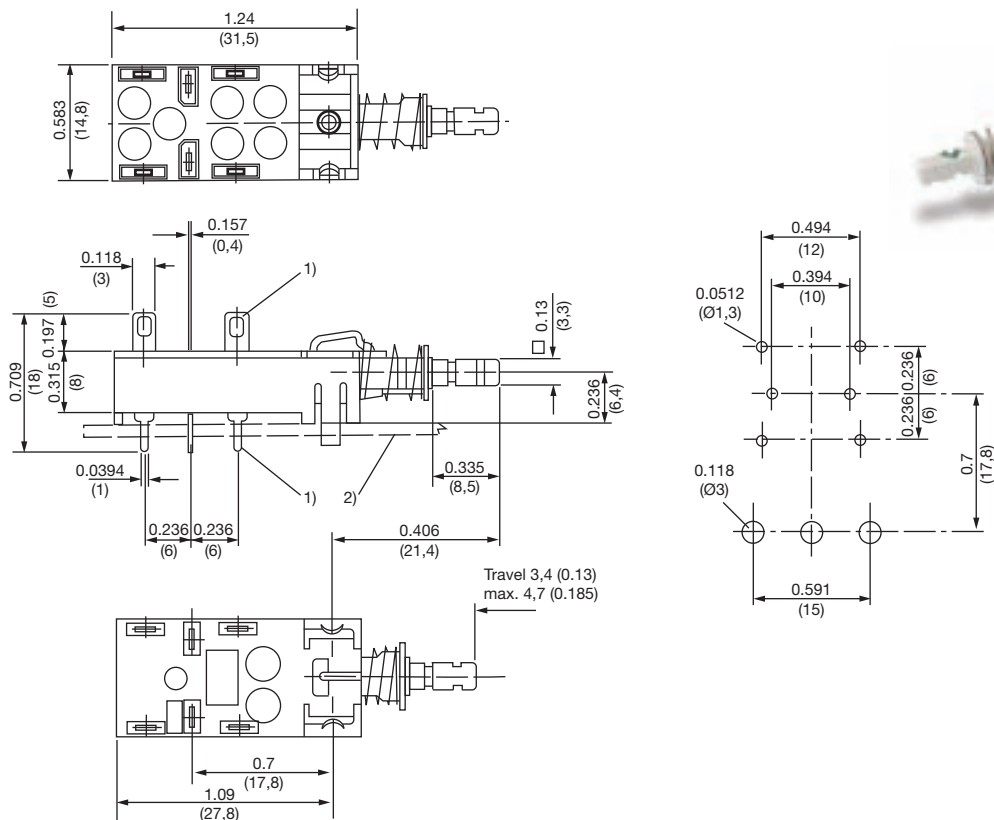
DESIGNATION & SWITCHES WITH STANDARD OPTIONS



NE1839EE



NE1848EE



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

NE-18 Series Mains / Power Switches

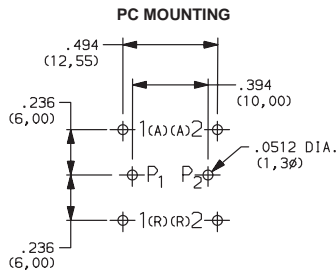
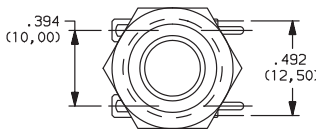
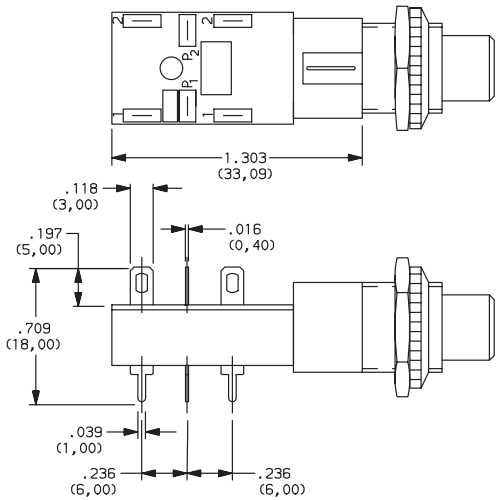


Pushbutton

DESIGNATION & SWITCHES WITH STANDARD OPTIONS



ZNE1838EECF0201



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



NE-18 Series Mains / Power Switches

Pushbutton
A

CONTACT ARRANGEMENT



OPTION CODE Contact capacity and availability	STYLE	ELECTRICAL CIRCUIT
37	NE18 – 2AX	DPST
38	NE18 – 2UX	DPDT
51	2U + NE18 – 2AX	DPST*
52 (4A/64)	NE18CTII – 2AX	DPST
39	2U + NE18 – 2UX	DPDT*
41	NE18 – 2AP	DPST
42	NE18 – 2UP	DPDT
43	NE18 – 2AW	DPST
44	NE18 – 2UW	DPDT
45	NE18 – 2ASX	DPST

- * 2U + Denotes auxiliary set of low current contacts DPDT
 2A = DPST
 2U = DPDT
 S = Snap-in mounting
 X = Solder lug/PC pins
 W = Solder lugs only
 P = PC pins only

OPTION CODE Contact capacity and availability	STYLE	ELECTRICAL CIRCUIT
46	NE18 – 2USX	DPDT
47	NE18 – 2ASP	DPST
48	NE18 – 2USP	DPDT
49	NE18 – 2ASW	DPST
50	NE18 – 2USW	DPDT
53 (4A/64)	2U + NE18CTII – 2AX	DPST
54	2U + NE18 – 2AW	DPST
55	2U + NE18 – 2AP	DPST
56	2U + NE18 – 2UW	DPDT
57	2U + NE18 – 2UP	DPDT

NOTES

- Contact plating is silver on all Power Switches.
- The electrical function is Break Before Make (BBM) on all Power Switches.
- The terminals will be epoxy sealed.

TYPE	POSSIBLE CONTACT ARRANGEMENT		CONTACT SPACING	PROTECTION CLASS (CEE 24)	APPROVALS
	POWER CONTACTS ¹	AUXILIARY CONTACTS			
NE18	2A ²	2U	> 3mm (.118 inch)	II	VDE, BSI, DEMKO, NEMKO, SEMKO, SEV, CSA, UL
NE18	2A ² 2U	2U	> 3mm (m) (.118 inch)	I	VDE, MEEI, BSI ³ , DEMKO, NEMKO, SEMKO, SEV, CSA, UL
NE18CTII	2A ²	2U	> 3mm (.118 inch)	II	VDE, BSI, DEMKO, CSA, SEMKO, SEV, UL, NEMKO

- 1) A = make contact, R = break contact, U = changeover contact, m = VDE sign for switches with a contact spacing (air gap) < 3mm (.118 inch) according to VDE 0630/CEE 24.
- 2) With 2A mains contacts: Mounting only by PC pins is not sufficient.
- 3) BSI only for 2U mains contacts.

MECHANICAL FUNCTION



OPTION CODE	FUNCTION
OA	Momentary
EE	Alternate (push-push)



Dimensions are shown: Inches (mm)

Specifications and dimensions subject to change

NE-18 Series Mains / Power Switches



A

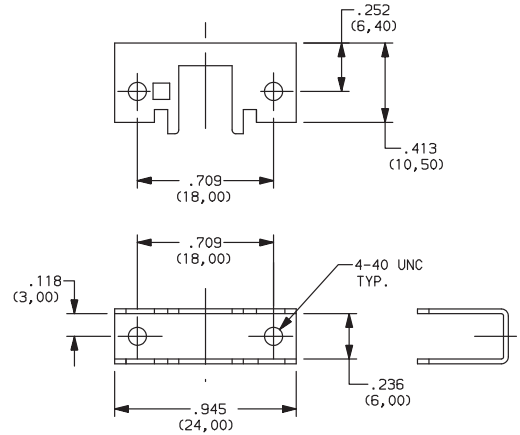
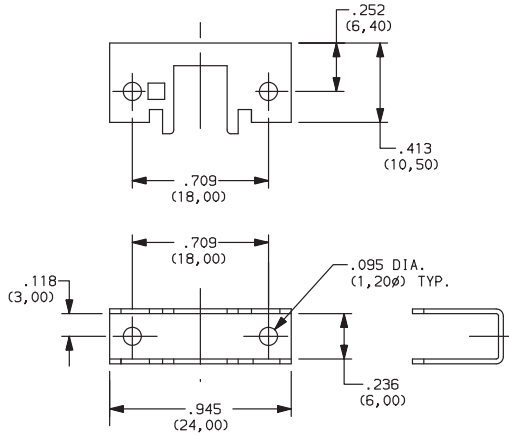
Pushbutton

SINGLE STATION CHASSIS

01 WITH .094 MOUNTING HOLES

(NONE) NO CHASSIS

02 WITH 4-40 TAPPED MOUNTING HOLES



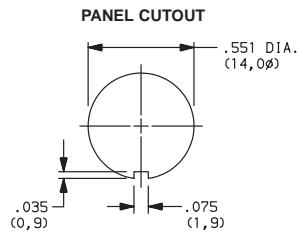
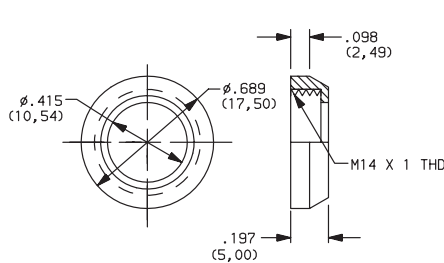
03 SPECIAL CHASSIS (CONSULT FACTORY)

DRESS NUT

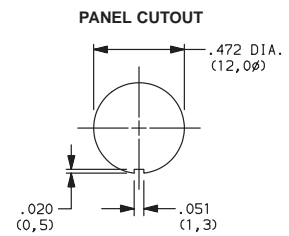
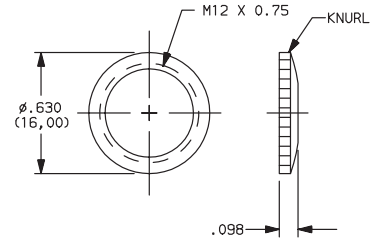
(NONE) NO DRESS NUT

B BLACK

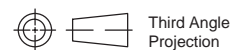
C CHROME



NOTE: Available with ZNE18 designation and FA200 buttons.



NOTE: Available with ZNE18 designation and FG button.



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



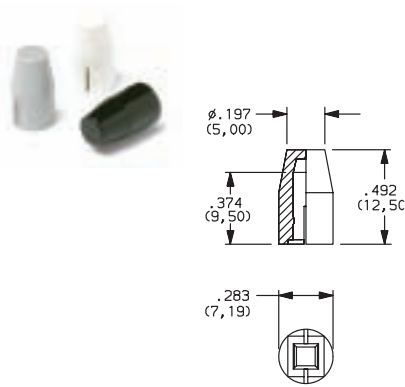
NE-18 Series Mains / Power Switches

SOLID BUTTON

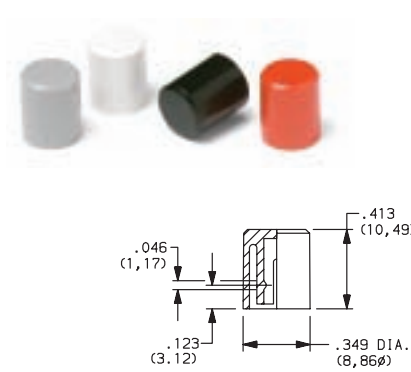
Pushbutton
A

STYLE

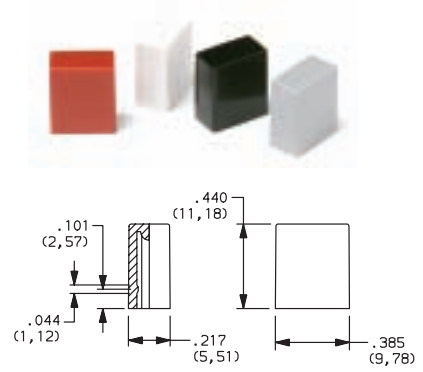
F01 FMR



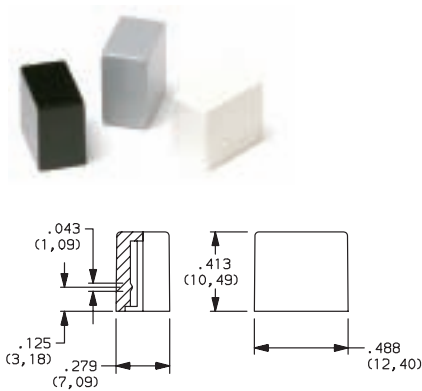
F02 FG



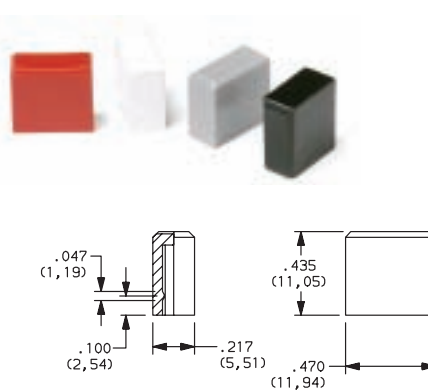
F12 FSC



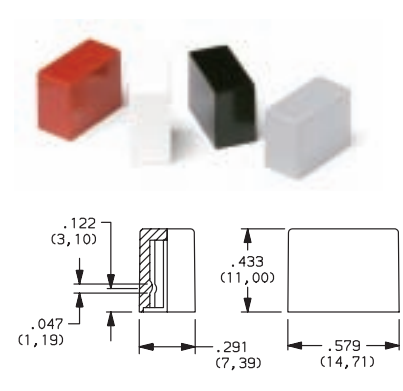
F13 FSD



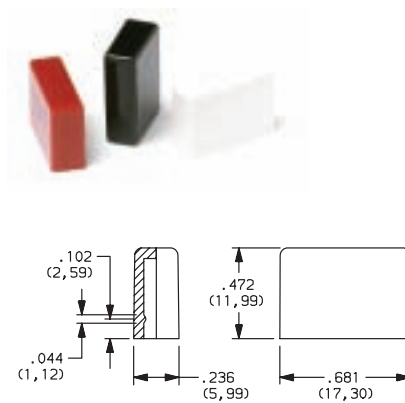
F14 FU12



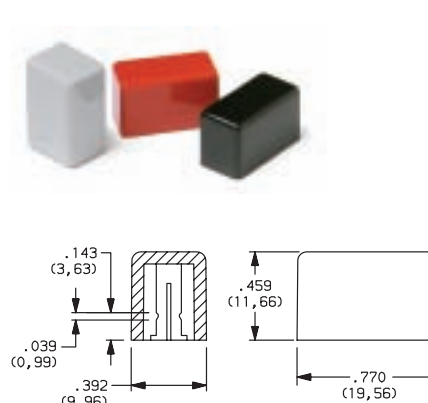
F15 FSB



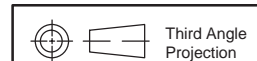
F16 FE



F19 FA



OPTION CODE	COLOR
01	BLACK
02	WHITE
03	RED
04	LT. GRAY



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change

C&K

NE-18 Series Mains / Power Switches



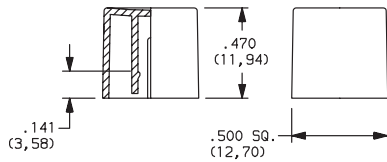
A
Pushbutton

SOLID BUTTON



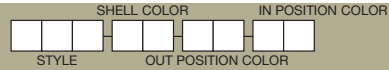
STYLE

F21 F001



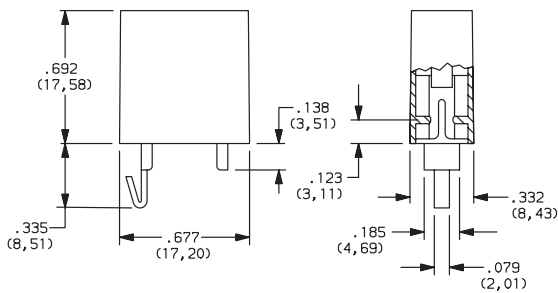
OPTION CODE	COLOR
01	BLACK
02	WHITE
03	RED
04	LT. GRAY
09	BLACK/CHROME (F03, F06 & F07 buttons only)

MECHANICAL BUTTON

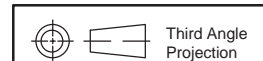
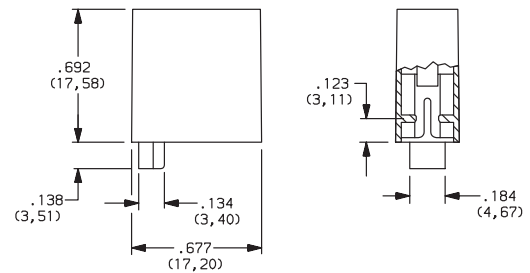


STYLE

F01 FA100



F02 FA101



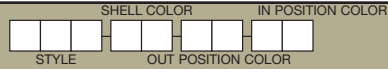
Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change



NE-18 Series Mains / Power Switches

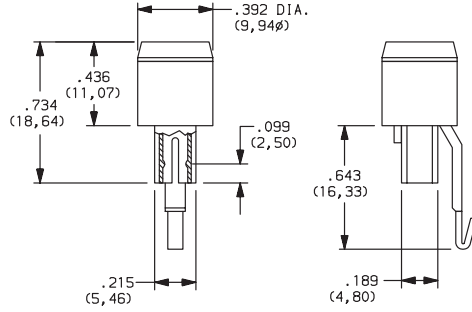
A
Pushbutton

MECHANICAL BUTTON

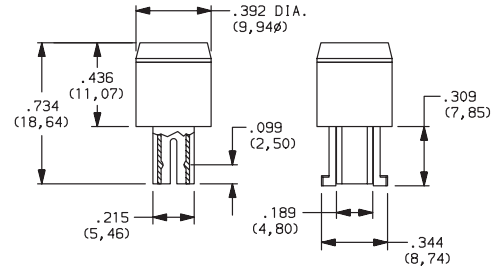


STYLE

F08 FA201



F11 FA200



SHELL COLOR

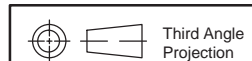
01 BLACK

OUT POSITION COLOR

01 BLACK

IN POSITION COLOR

OPTION CODE	COLOR
02	WHITE
06	YELLOW
07	BLUE
08	GREEN
12	ORANGE



Dimensions are shown: Inches (mm)
Specifications and dimensions subject to change